

WORKS OF INTERNAL IMPROVEMENT.

LETTER

[FROM

THE SECRETARY OF WAR,

TRANSMITTING

The information required by a resolution of the House of Representatives of the 2d instant, in relation to certain works of internal improvement.

APRIL 14, 1836.

Read, and laid upon the table.

WAR DEPARTMENT, April 13, 1836.

SIR: I have the honor to transmit a report of the Chief Engineer, furnishing the information respecting the various works of internal improvement, called for by the resolution of the House of Representatives of the 2d instant.

Very respectfully,

Your most obedient servant,

LEW. CASS.

HON. JAMES K. POLK,

Speaker of the House of Representatives.

ENGINEER DEPARTMENT,

Washington, April 12, 1836.

SIR: In answer to the resolution of the House of Representatives of the 2d instant, calling for certain information relating to the various works of internal improvement mentioned in the bill of the House, No. 297, I have the honor to hand you the annexed statement, giving an account of the state and condition of each work under the superintendence of this Department, as annually reported to Congress; the amounts appropriated and expended on each; the original estimates, and estimates to complete, where the same are to be found on the files of this office; and to state that the original estimates, it is believed, in every instance, were designed to construct temporary works, as experimental, to ascertain what would be their effect in removing the various obstructions existing at the several points on the lakes, and in creating, at these points, artificial harbors, suitable to the wants of commerce and navigation. That the improvements in question

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have tended to the settlement of that country, generally; have facilitated the transportation of its produce, and augmented its commerce, it is believed there can be no doubt, and as the increase of tonnage, in the last ten years, on Lakes Erie and Ontario, will show. This increase has been from 5,963 $\frac{3}{5}$ tons to 15,696 $\frac{3}{4}$ tons, and is some evidence that these works have had the effect contemplated.

I am, very respectfully, sir,

Your obedient servant,

C. GRATIOT.

Hon. LEWIS CASS,

Secretary of War.

Chicago harbor.—The survey made of this harbor by Dr. William Howard, civil engineer, was reported to Congress under date of March 1, 1828. (See Doc. No. 69, 1st session, 21st Congress.) The total cost of the work, as estimated by him, *exclusive of dredging*, amounts to \$59,722 74; and in 1833 the first appropriation was made for this work. In November of that year, it was reported that, it being impossible to command the services of an engineer officer at this place, the works were given in charge of the commanding officer at Fort Dearborn; that considerable difficulty was experienced in procuring materials and workmen, and that almost every thing, except timber and stone, had to be drawn from Buffalo; that after rejecting the first proposals on account of their exorbitant character, and inviting others, contracts were made for a small supply of stone and timber, more with a view to develop the resources of the country, than with the hope of progressing with the work; that little had been done, further than to collect some materials and workmen, and to construct a small portion of one of the piers.

Under date of November 1, 1834, it was reported that operations had progressed in a satisfactory manner, considering the late period at which the appropriation became available, and the difficulty in a country just emerging from a state of wilderness; that the great importance of this improvement was already felt; that one hundred and eighty vessels, between the opening of navigation and the 30th September, had discharged their cargoes at this point, to be distributed along the shores of the Mississippi.

Under date of November 15, 1835, it was again reported that the operations had been successfully prosecuted, notwithstanding the difficulties under which they labored. The condition of the works was stated, as well as the advantages they procured to commerce.

Under date of the 14th January, 1836, the following communication was laid before the Committee of Ways and Means:

ENGINEER DEPARTMENT, Jan. 14, 1836.

SIR: In answer to the letter of the Hon. C. C. Cambreleng of the 4th instant, requesting, in behalf of the Committee of Ways and Means, all the information in possession of the Department relating to the harbor of Chicago, referred by you to this office, I have the honor to state, that in February, 1830, Dr. William Howard, civil engineer, in obedience to directions from the Department, presented a report and estimate for the improvement of this harbor, which was submitted to Congress on the 1st of March following.

In 1833, \$25,000 were appropriated by Congress for this improvement; and in May of that year, Major Bender, of the Quartermaster's Department, was appointed superintendent. A further appropriation of \$32,801 was made in 1834, when Lieutenant J. Allen was appointed to succeed Major Bender in the superintendence of the work; and who, on the 30th of September of that year, submitted a detailed report, and an estimate for the construction of the works contemplated.

A copy of the first report and estimate of Dr. Howard, marked A, (Doc. 69, 1st session, 21st Congress,) as well as those of Lieutenant Allen, marked B, are herewith transmitted; by which it will be seen that the excess of the last estimate over the first is caused by the necessity of extending the piers more than double the distance proposed by Dr. Howard, and otherwise increasing their dimensions, which experience alone, and the minute investigation accompanying the operations, could fully have developed.

A copy of Lieutenant Allen's report of the 30th of September last, marked C, showing the state of the works, the difficulties encountered in their construction, and the amount necessary to complete them, is also annexed for the information of the committee.

The whole amount already granted by Congress amounts to \$90,601, viz:

Amount appropriated in 1833	-	-	-	\$25,000
Do. do. 1834	-	-	-	32,801
Do. do. 1835	-	-	-	32,800
				<u>\$90,601</u>

The amount estimated for by Lieutenant Allen to complete the work, is \$68,350,* making, with that heretofore appropriated, \$158,951; and the amount originally estimated by him is \$162,519 20;† so that, notwithstanding heavy incidental expenses, which could not have been anticipated, the work is expected to be completed within the original estimate.

It is proper, however, to remark, in order that the committee may have the whole subject before them, that the works thus designed and executed are intended as an experiment, to ascertain whether an artificial harbor, suitable to the wants of the navigation of the lake, and to the commerce of the country, can be constructed; that it has succeeded thus far, and tended to bring into cultivation the vast country west of Chicago, there is no doubt; and it will depend upon Congress to say whether, if found still to answer the convenience of the community, it will not be to the interest of the country to replace those temporary constructions by permanent works, as has been done at other points on the lake.

I am, &c.

C. GRATIOT,
Chief Engineer.

HON. SECRETARY OF WAR.

The estimate of Dr. Howard can only be considered as *experimental*, as he states in his report, "that he was prevented by the unusually boisterous and inclement weather, from procuring such minute data" as he

* This amount, \$68,350, is for the works extending into the lake, and not for the river improvement.

† To this sum, \$162,519 20, should be added \$43,042 00, expended previously, making \$205,561 20, as the whole estimated cost of the work.

could have wished. The estimate of Lieutenant Allen is considered as the original estimate, amounting to - - - \$205,561 20
 Amount appropriated up to this time, viz: in 1833, \$25,000

Do.	do.	1834,	32,801
Do.	do.	1835,	32,800

 90,601

Estimate for 1836, to complete the improvements in the lake - - - - - 68,350

 158,951 00

Leaving for dredging out the river channel, and forming river improvements, before exhausting the original estimate - \$46,610 20

Big Sodus bay.—An appropriation was made in 1828, for the survey of this harbor, which was reported to Congress in February, 1829, (see Doc. No. 106, vol. 3, 2d session, 20th Congress,) when the first appropriation was made for commencing the improvement.

Under date of 19th November, 1830, it was reported, in substance, that this sum had been applied to the construction of corresponding parts of both piers, and it was expected that an equal quantity of work would be done the succeeding year, upon which supposition the estimate was based.

Under date of 4th November, 1831, it was reported that the piers had been extended about 400 yards, making the eastern pier 556 yards long, and the western 260 yards. That these works had produced no effect in deepening the channel, nor was it expected they would have done so; the bottom of the lake at that place being so hard as to make an artificial excavation necessary.

Under date of 13th November, 1832, it was reported that the progress made during the past year was of the most flattering character, owing to the previous preparations of materials, and the fitness of the weather for work, notwithstanding the lateness of the season at which the appropriation became available. That 30 cribs had been constructed and put in place, and the resistance that the piers thus far had opposed to the action of storms and large masses of ice, gave evidence of the accomplishment of the object for which they were intended, viz: useful and safe harbors of refuge for vessels engaged in the foreign and domestic trade. That it was believed all the operations might be brought to a close during the ensuing year, except that of dredging, which would be commenced as soon after as possible, with a view to connect the interior with the exterior channel.

Under date of November 23, 1833, reference was made to the report of the superintendent, for the condition and progress of the works, and it was stated, for the reasons given, that it had been thought advisable to bring the whole subject of the works of improvement on the lakes, fully to the consideration of Congress; that, therefore, a thorough inspection had been made by a skilful and experienced engineer, whose report was submitted.

By this report (Doc. No. 1, page 85, 1st session, 23d Congress) it will be seen in what consisted these works at that time; what their condition, and that they had been completed as originally projected. An extension of both piers was then in progress, and various suggestions were proposed by Colonel Totten for the completion of this improvement, and enumerated in said document. It was expressly stated that the work had been experi-

mental, and therefore, in the first instance, constructed of *perishable materials to save expense*. That the success of the experiment was no longer doubtful, and to ensure the benefits derived, the perishable material must be replaced by *permanent*.

An estimate was presented for these objects amounting to \$77,700, which formed no part of the original plan, and therefore not embraced in that estimate, which, by reference to Doc. No. 106, 3d vol. 2d session, 20th Congress, amounted to - - - - - \$71,931 20

The appropriations up to that time were, in 1829, \$12,500			
Do.	do.	1830,	15,280
Do.	do.	1831,	17,450
Do.	do.	1832,	17,000
			62,430 00

Which falls short of the estimate by - - - - - \$9,501 20

Under date of 1st November, 1834, the report of the general superintendent was submitted to Congress, which stated the application of the appropriation granted at the preceding session in detail, as well as what was proposed to be effected the next year.

Under date of 15th November, 1835, the whole report of the superintendent was again submitted, in which his views were given in detail.

The aggregate estimate for this work, as above stated, is - \$149,631 20
And the appropriations up to this time, amount to - \$104,020 00

Provincetown harbor, Massachusetts.—The first appropriation for this harbor was made under the act of 20th May, 1826, without any estimate from the Department; and, with the other objects named therein, its execution was assigned to the Department of War, and the naked act, without any of the data upon which the several appropriations were founded, was referred to the Engineer Department. (See letter of instructions to Colonel Totten, 10th July, 1826, marked D.) The preservation of the harbor by endeavoring to cover the ground with a firm sod of grass to arrest the drifting sand, must of course have been considered problematical, and the application of the sum appropriated by Congress, was made to test the efficacy of the experiment, and to ascertain whether its success would warrant further expenditures. It was not supposed that the amount granted was sufficient for the object in view, but for the operations of one year.

Under date of 18th November, 1829, it was reported, in substance, that the appropriation of 1826 had reverted to the surplus fund, from the inability of the Department to procure a local agent to direct the works, and that the same cause had prevented the application of its reappropriation at the last session of Congress.

Under date of 19th November, 1830, it was reported that an agent had been employed to apply the funds appropriated, to the planting of beach grass, and such other measures as the available means would allow, for effecting the object in view. That additional funds were necessary, but that no estimate was presented, as an appropriation had been included in the bill which passed at the preceding session of Congress, for erecting light-houses, &c.

Under date of 4th November, 1831, it was reported that the operations had been successfully prosecuted; that Colonel Totten, the inspecting engi-

neer, had stated that the complete success of what had been done, satisfied him of the expediency of pursuing the operations until the naked sands above high water should be covered with grass, and that a pressing necessity was found in the otherwise certain ruin of a most valuable harbor. An estimate was accordingly presented.

Under date of 13th November, 1832, it was reported that the plan for the preservation of this harbor, consisted in planting beach grass to arrest the progress of the drifting sand, which could only be done in the spring, and as the appropriation of the preceding session of Congress was not available before the middle of summer, no part of it had been applied.

Under date of 23d November, 1833, it was reported that 220 acres of ground had been planted with beach grass during the last spring, besides repairing many places previously planted, which had been injured by the encroachment of the sand.

Under date of November 1, 1834, it was reported, that the season proper for prosecuting the works having passed, before the funds for the purpose became available, operations had been of necessity postponed till the following spring, and that those parts of the beach heretofore worked on, were represented as doing well.

Under date of November 15, 1835, it was reported that upwards of 200 acres had been planted the past season, and that the parts of the beach already planted were doing well, and gave evidence that the protection of the harbor would be attained.

By reference to Document 116, vol. 3, 2d session, 22d Congress, it will be found that *no* original estimate has been made for the improvement of this harbor. That contained in Document 261, vol. 6, 1827, '28, (\$3,500) was the sum appropriated two years previous, and presented in a tabular statement to Congress, in reply to a call from that body, and two years *before* any operations had been commenced, as above stated, and that also referred to in Document No. 30, 2d session, 21st Congress, was presented under similar circumstances and conjectural.

The sums appropriated by Congress, up to this time, amount to	\$18,950
viz: in 1829	\$3,500
in 1831	2,050
in 1832	4,600
in 1834	4,400
in 1835	4,400
	<hr/> \$18,950

Plymouth Beach, Massachusetts.—On the 26th of May, 1824, Congress appropriated \$20,000 for the repairs of this beach, (page 286, vol. 7, Laws of the United States,) which was referred to the Engineer Department for execution, no previous survey or estimate having been made. (See instructions to Lieutenant Chase, June 28, 1824, marked E.) On the 20th of August, following, Lieutenant Chase, in obedience to instructions, reported the result of his examination, and furnished a project for the application of the appropriation, which required in addition, \$1,592. (Document 27, 2d session, 18th Congress.) On the 30th of October, as had been intimated in his previous report, he submitted a further estimate of what he considered necessary to be done, amounting to \$40,000. (Document 27, 2d session, 18th Congress.)

Under date of the 21st of November, 1825, it was reported in substance,

that the works for the security of the beach, which had been commenced late the previous season under an officer of engineers, had been continued under the general supervision of Colonel Totten, and the immediate superintendence of a gentleman of that place; that the appropriation of the preceding session had been advantageously applied, and though limited, had produced important results. That the appropriation then asked for (\$25,000, Document 24, vol. 3, 1st session, 19th Congress), if granted, would complete the work, and afford permanent security to the beach. \$13,184 90 were this year appropriated.

Under date of November 18, 1826, the favorable results attained were stated, and that the work would be finished next year. It was finished as anticipated, and under date of November 20, 1827, was reported to have been found fully adequate to withstand the violence of the sea the previous winter, and was daily gaining strength by the accumulation of sand.

Under date of November 19, 1828, it was reported that the works were in good condition, and that some additions might be necessary at a future time to maintain the advantages resulting from them.

Under date of November 18, 1829, it was reported that the small expenditures for this beach for the last two years, about \$500, were applied to keeping them in repair, and that from the nature of the work, it was desirable to have a small sum at command to check the encroachments of the sea, until by the effect of natural causes, constantly operating, the work should have acquired complete permanency.

Under date of November 4, 1831, it was reported that the fascine work and planting of grass had been in constant operation, as dictated by the circumstances of the case, and that the beneficial effects of what had been done, could be fully shown and secured only by the lapse of time, and by constant attention to the repairs of the work, which afforded a perfect shelter to the harbor. The reports of 1832, '33, '34, and '35, all go to show that the experiment for the preservation of the beach, had so far succeeded; that the benefits anticipated had been attained; that, as was to have been expected, the fascine work, beach grass, and stone wall, occasionally required extension and repairs; and that they accordingly received them from the small appropriations made from time to time by Congress. It was never supposed that the feeble means adopted for the preservation of the harbor, could have, without damage, resisted the violence and irresistible power of the sea, or stood uninjured the effects of time and storms. It has been seen that the estimate first submitted to Congress, amounted to

\$61,592 00

The appropriations by Congress up to this time,

viz: in 1824	-	-	-	-	\$20,000 00
in 1825	-	-	-	-	5,712 00
in 1826	-	-	-	-	13,184 90
in 1830	-	-	-	-	1,850 00
in 1831	-	-	-	-	2,820 00
in 1832	-	-	-	-	2,500 00
in 1833	-	-	-	-	600 00
in 1834	-	-	-	-	2,000 00
in 1835	-	-	-	-	700 00
					<hr/> \$49,366 90

Leaving an excess of the estimate over the expenditure of \$12,225 10

Black river, Ohio.—Under the date of November 19, 1828, it was reported that the execution of the works for the removal of obstructions at the mouth of this river, under the act of the 23d of May last, had been entrusted to an officer of engineers, by whom arrangements had been entered into for a commencement of operations.

Under date of November 18, 1829, it was reported in substance that satisfactory progress had been made in the work.

Under date of November 19, 1830, it was reported that about 300 yards of pier work had been constructed, the effect of which had warranted favorable anticipations from the completion of the proposed plan.

Under date of November 4, 1831, it was reported that the construction of 100 yards of pier work would complete the proposed plan of improvements which had already effected a depth of eight feet.

Under date of November 13, 1832, it was reported, that the works were in good repair, and believed to be secure against the recurrence of an accident, which had, in November last, deprived the east pier of about sixty feet of its length, to a depth of three feet below the surface of the water. That the damage had been repaired, and the pier extended. That a part of the appropriation for that year having been absorbed in said repairs, it would not be sufficient to complete the work as anticipated, and a further estimate was accordingly submitted. It was also stated that all the harbors on the south shores of Lake Erie, were in a situation to offer protection and safety to vessels navigating the lake, and to afford facilities of transportation to the produce of the country. That the improvement of these harbors had given to the people a spirit of enterprise and industry which was perceptible on the whole shore. That the works projected for these improvements, had in their execution produced results far exceeding the expectation of all who were acquainted with their situation prior to their commencement. But as they were in part constructed of perishable materials, and their completion near at hand, it was highly important that provision should be made for repairing injuries and preserving their usefulness.

Under date of November 23, 1833, it was reported, for reasons given, that in order to bring the whole subject of the different improvements on the lakes fully to the consideration of Congress, a thorough inspection of the same had been made by a skilful and experienced engineer, and that his entire report, as well as those of the local agents, were accordingly submitted. (Doc. No. 1, 1st session, 23d Congress.) From these will be seen the nature and condition of the works proposed for the improvements of the harbor in question; and that the original plan (which contemplated the construction of two parallel piers, at nearly right angles to the shore, and extending into the lake, the west pier 430 yards, and the east 300 yards,) had been fully carried out; that the advantages anticipated, had been realized, and the depth of water increased from 3 to $7\frac{1}{2}$ feet. That the experiment had so far succeeded, that the means available from the last appropriation, were to be applied in strengthening and securing the advantages obtained in erecting pier heads, filling in with stone, dredging shoal, erecting beacon light, &c. and which was estimated would cost, in addition, \$17,700; no part of which entered into the original plan.

Up to this time the sums appropriated, viz: in 1828, \$7,500 00	
	in 1830, 8,559 77
	in 1831, 9,275 00
	in 1832, 8,000 00
	<hr/> \$33,334 77
Original estimate, (Doc. 116, vol. 3, 2d ses. 22d Congress)	35,334 22
Excess of cost, owing to damage by storms, as above stated	<hr/> \$8,000 55

The appropriations since that time have been predicated upon the report of Colonel Totten, to carry which into effect seems to have been the wish of Congress, and their application has been reported under dates of November 1, 1834, and November 15, 1835.

Original estimate, as above stated	-	-	\$25,334 22
Additional estimate by Colonel Totten	-	-	17,700 00
			<hr/> \$43,034 22
Total amount of former appropriations	-	-	\$33,334 77
	in 1833	-	2,400 00
	in 1834	-	5,000 00
	in 1835	-	4,400 00
Estimate for 1836	-	-	6,660 00
			<hr/> 51,794 77
Excess	-	-	<hr/> \$8,760 55

Cleveland Harbor, Ohio.—The appropriation made under the act of 2d March, 1827, "For improving Cleveland harbor, in the State of Ohio, ten thousand dollars," was the first granted for this object. It was appropriated without any previous survey or estimate. (See instructions to Major Maurice, marked F.) The mode of improvement was not pointed out, and its execution devolved upon the Department of War.

Under date of November 20, 1817, it was reported that a commencement of the work had been made, by the construction of a dam across the mouth of the river, the excavation of the sand bar at its entrance, and contracting for the delivery of the necessary materials.

Under date of the 19th November, 1828, it was reported that the work had been continued with success, and had afforded an easy entrance into the harbor to most vessels navigating the lake. That, to prevent any accumulation of sand at the entrance, in future, it was proposed to continue the works further into the lake, the bed of which was clay.

Under date of November 18, 1829, it was reported that 262 yards had been added to the length of the piers during the past year, and that the estimate, \$1,786 57, then asked for, would complete the work.

Under date of 19th November, 1830, it was reported that the harbor had been greatly improved by the works erected for removing obstructions at its entrance, and that it would admit the largest class of vessels navigating the lake. To secure these advantages, a further extension of the western pier into deep water was required.

Under date of 4th November, 1831, it was reported that the effect of the works for improving the entrance of this harbor, had been in the highest degree satisfactory, the channel having a depth of not less than ten feet. That its importance and usefulness fully justified the expenditure already

made, as well as that proposed for completing the work, by strengthening the dam across the former outlet of the river, and removing a small spit of sand at its junction with the artificial channel.

Under date of 13th November, 1832, it was reported that the available funds for the work had been applied towards its completion, driving piles, filling in with stone, &c. and that by the close of the season, it would be rendered secure, and no further appropriation would be necessary. The great and general benefit afforded to the commerce of the lake, and to the inhabitants on its southern shore, by the construction of the artificial harbors under the General Government, was also adverted to, and that being in part constructed of perishable materials, the importance of providing for repairing injuries, arising from decay or accidents, was stated. When the work was barely commenced, as reported under date of November 20, 1827, and in answer to a call from Congress, the amount first appropriated, \$10,000, was stated as the cost of construction, (Doc. 261, 6th vol. 1st ses. 20th Congress,) as the wishes of Congress were no further known than as discovered by the act of appropriation. But by reference to Doc. 116, 3d vol. 2d ses. 22d Congress, it will be seen that the original estimate of the cost of this improvement, is stated to be

			\$27,653 91
The appropriations up to this time, viz :	in 1827	\$10,000 00	
	in 1829	12,179 00	
	in 1830	1,786 56	
	in 1831	3,670 00	
	in 1832	6,600 00	
			<hr/> 34,235 56
Excess of appropriations over estimates			<hr/> <hr/> \$6,581 65

Under date of 23d November 1833, as mentioned in the case of the other works on the lake, and for the object there stated, an inspection of this place was made by an officer of engineers, and his report laid before Congress. (Doc. No. 1, 1st ses. 23d Congress.) It is there stated that the mouth of this river, that had formerly at times been closed, then afforded a draught of 11 feet water; that recent examinations had shown that a certain quantity of stone must be deposited, to guard against the undermining of the piers; that it was also necessary to fill in the piers with additional stone where settlement had taken place; that an addition to the pier, for the protection of the beacon-light, must be made; and other items were enumerated, the whole estimated to cost \$13,315. This amount was granted, and its application reported under date of 1st November, 1834, where it is stated that the amount was deemed sufficient for that and the succeeding year. That the labor and materials were applied to strengthening the works and keeping them in repair. That the depth of water still remained from 10 to 11 feet. That the timber work above water was going fast to decay, and would require renewing from time time to time, until the piers became so well based as to warrant the safety of the superstructure of solid masonry, which was estimated to cost \$125,320.

Under date of 15th November, 1835, the operations that had been carried on for depositing stone against the outside of the piers, for their permanent security, &c. were reported; and that it was proposed next year to extend the west channel pier to the full length that would be required to guard against the encroachments of the sand, and to progress as rapidly as was consistent with economy in giving the whole work a permanent character.

Original estimate	-	-	-	\$27,653	91
Additional estimate by Colonel Totten	-	-	-	13,315	00
Estimate to render the work permanent	-	-	-	125,320	00
					<hr/>
					\$166,288 91
Amount of former appropriations	-	-	-	\$34,235	56
Appropriated in 1834	-	-	-	13,315	00
Estimate for 1836	-	-	-	30,000	00
					<hr/>
					77,550 56
					<hr/>
					\$88,738 35
					<hr/>

Grand river, Ohio.—In 1825, \$1,000 were appropriated for the improvement of this river, which that year were not drawn from the Treasury. In 1826, \$5,620 were appropriated, in addition, under the act of 20th May. In June, the execution of this act, which comprised other objects on the lake, was charged upon the Department of War, and the details assigned to the Engineer Department. No preliminary survey or estimate having been made, the officer charged with the operations, was required to confine his plan of improvement within the amount appropriated.

Under date of 18th November, 1826, it was reported that contracts had been made for procuring the requisite materials; that the construction of the work was going on, and would be completed next year, (referring, however, to the plan embraced within the appropriation.)

Under date of November 20, 1827, it was reported that the work had progressed in a satisfactory manner; that both piers were nearly completed, and that the effect thus far had been to remove the sand at the mouth of the river, and to increase the depth of the channel sufficiently to admit all vessels which navigated the lake, except on a small bar beyond the end of the east pier; that the completion of the west pier would remove that obstacle, for which an additional sum had been found necessary.

Under date of 19th November, 1828, it was reported that the construction of the work had been successfully prosecuted, and that the harbor had been accessible at all times during the summer.

Under date of 18th November, 1829, it was reported that no funds having been appropriated that year for the works, a further sum was then asked for to complete them; that the progress of the construction had been as great as the means would permit, and that the beneficial effects attained still continued to be felt.

Under date of November 19, 1830, it was reported that the piers had sustained some damage from having been left in an unfinished state, as mentioned in the preceding annual report, for want of funds to complete them; and that, in consequence, the appropriation made that year for their completion had not been sufficient.

Under date of November 4, 1831, it was reported that nothing remained to be done, but to raise a part of one of the piers that had settled, and to complete the beacon light.

Under date of November 13, 1832, it was reported that the harbor was in good condition, and that no further provision for funds would be necessary to complete the works.

In 1827, in answer to a call from Congress, (H. Doc. 261, 1st session, 20th Congress,) the amount appropriated up to that time, \$14,755 11, was stated as the cost of the construction, and for the reason alluded to in other

instances. By reference to Doc. 116, 3d volume, 2d session, 22d Congress, the original estimate of what was deemed sufficient for this harbor is stated to be

The appropriations up to this time, viz: in 1825	\$1,000 00	\$26,997 81
1826	5,620 00	
1828	9,135 11	
1830	5,563 18	
1831	5,680 00	
1832	2,600 00	
		29,598 29
Excess of appropriations		\$2,600 48

Under date of November 23, 1833, the result of the inspection of this harbor, for the purpose of presenting its true position to Congress, in common with other points on the lake, was reported. It is there stated that the works had produced a straight and free channel of at least twelve feet depth, while, before, the mouth of the river was often entirely closed; that the softness of the bottom, which yielded so easily to the current of the river, also rendered it necessary to protect the sides of the piers, and to raise them when settled; that, for reasons stated, the probable cost of rendering the work permanent could not be stated. The report of the local agent was also given; and upon his estimate, an appropriation of \$10,000 was granted. This sum, as reported under dates of November 1, 1834, and November 15, 1835, has, it will be seen, thus far answered the wants of the harbor.

Total amount of appropriations - - - - - \$39,598 29

Cunningham creek, Ohio.—Under the act of May 20, 1826, an appropriation of \$2,000 was also made, "to remove obstructions at the mouth of Cunningham creek," which was the first granted for that purpose; and, together with the preceding improvement, its execution was assigned to the Engineer Department under similar circumstances. The instructions to Major Maurice, as in that instance, direct him to confine his plan to the amount embraced within the appropriation; and the "contracts" reported under date of November 18, 1826, to have "been made for the execution of this work, and that the same would be completed in the course of next year," point only to the work authorized by the appropriation, and not to that required for the improvement of the harbor.

Under date of November 20, 1827, it was reported that these contracts had been faithfully executed, and the work carried on as far as the available means would justify; that the piers thus constructed required to be loaded with stone; and that it had been necessary to repair the old work, (constructed by a company incorporated by the State of Ohio to improve the harbor,) before the new work could be extended.

Under date of November 19, 1828, it was reported that the pier constructed by this company, together with the experimental pier, twenty yards in length, attached to it by the United States, had been carried away by the severe storms of the lake; that pier work filled with stone had been substituted for the old pier; and the original *mode of construction* had been abandoned.

Under date of November 18, 1829, it was reported that the pier was

nearly completed, and would be finished that year. It was finished as anticipated.

By reference to Doc. 116, 3d vol. 2d session, 22d Congress, the original estimate is stated to be - - - - - \$6,473 82

The appropriations up to that time, viz: in 1826	\$2,000 00	
1828	1,517 76	
1829	2,956 00	
		<u>\$6,473 76</u>

It was found necessary for the protection of vessels lying alongside the pier to construct a pier head, for which an appropriation was not granted; and under date of November 4, 1831, it was reported that nothing had been done the past year.

Under date of November 13, 1832, it was reported that the means provided for the erection of a pier head had not been sufficient to complete it, and an addition of \$500 was that year given.

The result of the inspection of this work, as well as of the others on the lakes, to put Congress in possession of its true state, was reported under date of November 23, 1833. (Doc. No. 1, p. 97, 1st session, 23d Congress.) The plan conceived by Major Maurice for the improvement of this harbor is there stated—the construction of only one pier had as yet been provided for by the appropriations of Congress—and to carry out which plan would require \$15,554 10. It was also stated, to give a permanent character to the works would require the future application of stone work for the wood work, the cost of which could not then be calculated.

Under date of November 1, 1834, and November 15, 1835, the condition of the works was reported, as well as the opinion of the Department, that further appropriations to secure them were necessary, unless it was the intention of Government to abandon the improvements.

Original estimate for one pier - - -	\$6,473 10	
Cost of construction of pier head - - -	2,000 00	
Estimate to complete plan of Major Maurice - - -	15,554 10	
		<u>\$24,027 20</u>
Amount of appropriations as above stated - - -	\$6,473 76	
appropriated in 1832 - - -	1,500 00	
1833 - - -	500 00	
		<u>8,473 76</u>

Excess of estimates over amount appropriated - - -	<u>\$15,553 44</u>
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Conneaut creek.—On the 24th October, 1826, Maj. Maurice was directed to make an examination of the mouth of this creek, with a view to ascertain the practicability of converting it into a harbor, and, if practicable, to submit a plan and estimate for that purpose. The result of his examination was received in the following December, and on the 15th of January, 1828, was communicated to the Committee on Commerce, upon the call of its chairman for such reports and surveys as had been made, relating to harbors, rivers, &c. with a view to their improvement. The first appropriation of \$7,500, for removing the bar at its mouth, was made in 1829; and under date of November 18, 1829, it was reported that the operations had been commenced and successfully prosecuted.

Under date of November 19, 1830, it was reported that three hundred and fifty-eight yards of pier work had been added; and that the effects of the operations had increased the depth of the channel to six feet water.

Under date of November 4, 1831, it was reported that the depth of water continued to increase with the execution of the pier, and was then eight feet.

Under date of November 13, 1832, it was reported that the pier had been extended during the year sixty yards; and it was believed that the available funds would be sufficient for its completion. By the report of Colonel Totten, communicated to Congress, under date of November 23, 1833, for reasons then stated, and before alluded to, (Doc. No. 1, page 96, 1st session, 23d Congress,) it appears that the anticipations of the Department would be realized; and, moreover, that previous to the erection of the piers, the mouth of the creek was often entirely closed; that, except at one spot where there was a narrow gravel bank with eight feet water over it, the channel then varied from nine to eleven feet, and remained equally deep at all seasons; that a beacon light ought to be placed on one of the piers; and that, in common with the other temporary constructions on the lake, the wood work was decaying, and would have to be built of permanent materials, if intended to be retained, but that there was no data at hand whereon to found an estimate of their cost.

Under the same date, the report of the local agent, which was also communicated, stated that the stone piers had settled considerably, and required to be filled in even with the top timbers; and that stone mixed with brush ought to be thrown around the head and outside of the piers.

In Document No. 116, 2d session, 22d Congress, the original estimate is stated to be \$20,001 65

The appropriations up to this time, viz: in 1829,	\$7,500 00	
in 1830,	6,135 65	
in 1831,	6,370 00	
in 1832,	7,800 00	
		27,805 65
Excess -		\$7,804 00

Under date of November 1, 1834, the report of the local superintendent was again communicated to Congress, and it was stated that the available means had been applied to repairing the works and deepening the channel, and that an additional quantity of stone was required to fill in the piers.

On the 15th of November, 1835, it was reported that the works were finished; that the sand which had accumulated against the western pier, was beginning to pass round it; the wood work decaying; the depth of water was 9 feet, and that no immediate measures were then necessary to guard against those evils. It is stated besides, as evidence of the value of the harbor to the commerce of the lake, that within a month as many as 26 vessels had at one time taken shelter in the harbor during a gale of wind. The estimate proposed for the coming year, is to dredge out a sufficient space *in the creek* to allow the large steam-boats to turn, and forms no part of the expense of the piers for the formation of the harbor.

Presque Isle, Pennsylvania.—In 1823, the result of the examination of

the harbor of Presque Isle by the board of engineers, the plan which they proposed for its improvement, and the probable cost thereof, was presented to Congress. (See H. R. Doc. No. 2, vol. 1, 1st session, 18th Congress.) The harbor is there described, its currents accounted for, and the habits of the waters of Lake Erie and Presque Isle bay stated to be so peculiar, and different from those of rivers, as to justify the project proposed by them. It is also confessed that so difficult is it to foresee all the effects, where such inconstant and powerful agents are to operate, that they would not have ventured to propose it, did it not form a part of the only plan which can be resorted to, to effect the object in view. The estimate in detail gives \$14,887 29, provided the current will deepen the channel, and \$35,900 82, if it will not. In 1824, \$20,000 were appropriated for this work.

Under date of November 21, 1825, it was reported that the works had been commenced; the results so far afforded evidence of the feasibility of the plan, and that the work would be completed the following season, should the estimate for that purpose be granted. Only \$7,000 were appropriated.

Under date of November 18, 1826, it was reported that the operations had increased the depth of water on the bar to 5 feet; that it was anticipated the completion of the south pier and dike would increase it to 9 or 10 feet, and that these objects would be effected early in the ensuing year. It was also stated, that it had been understood the funds for the construction of the south dike would be furnished by the State of Pennsylvania, and that they were not embraced in the estimate for the work; and an appropriation of \$2,000 for that purpose was asked.

Under date of November 20, 1827, it was reported that the work at Presque Isle had continued to produce the desired effect of deepening the water on the bar; that the anticipated completion of the south dike, for the sum asked for the last year, would have been realized, but that the depth of water continuing to increase with the progress of the work, it had been necessary to sink a part of the dyke in a depth of 30 feet water, instead of that originally existing. This consequently took more material, and increased the expense.

Under date of November 19, 1828, it was reported that the works had been completed, and had already nearly accomplished the intended object; that the least depth on the bar was now 7 feet, where formerly the greatest was *four*, and that steam-boats, and other vessels navigating Lake Erie, entered the port without difficulty; that the violent storms of the lake had caused a breach in the point of sand forming the bay, which, if not repaired, might cause serious injury to the harbor, and the propriety of making an appropriation for that purpose was suggested.

The appropriations up to this, viz:		in 1824,	\$20,000 00	
		in 1826,	7,000 00	
		in 1827,	2,000 00	
		in 1828,	6,223 18	
				\$35,223 18
Original estimate	-	-	-	35,900 82
Excess of estimate over appropriations				\$677 64

Under date of November 18, 1829, it was reported that the completion of the operations at this harbor had been attended with complete success; that a commodious anchorage for the largest class of vessels navigating the lake had been formed; that over the bar, which formerly had but $1\frac{1}{2}$ feet of water, 7 feet might now be carried.

Under date of November 19, 1830, it was reported that the improvement still continued, and that there was not less than 9 feet over the bar. An appropriation of \$1,700 was asked and granted, for repairing damages sustained by the dike, constructed by the State of Pennsylvania, during a gale the preceding winter, which formed no part of the work embraced in the original estimate. In 1831, it was reported that the funds appropriated at the preceding session, for the repairs therein mentioned, had been found not sufficient. An additional estimate of \$4,500 was therefore submitted, which, it was believed, would be ample for all that was then proposed to be done for the harbor. The superintending engineer reported to the Department that year, that from personal observation, he was aware that the injury done to these works was caused by drift wood passing through the opening at the head of the peninsula, and driven by the violence of the storms and seas against them; that to remedy this evil, two plans suggested themselves: but being a new project, no estimate was presented, it belonging to a separate report, which would be made whenever required.

Under date of November 13, 1832, the condition of the works was reported; that the breach through the peninsula at the head of the bay, was represented as having an injurious effect on the harbor; it was increasing, and fears were entertained that the whole of the peninsula would be removed; and to close this breach, or to confine it to a channel sufficiently large to allow the passage of vessels through it, would require a sum equal to the whole amount already expended on this harbor.

Under date of 23d of November, 1833, the result of the inspection of this harbor, by Colonel Totten, was reported to Congress, in connection with the rest of the works of the lakes; (Page 92, Doc. No. 1, 1st session, 23d Congress;) the condition and extent of the works; the changes and breaches produced in the peninsula; the beneficial effects attained; the delicate nature of the experiment; the uncertainty and ignorance of the cost of the final operations, and suggestions for their improvement or remedy, are there stated.

Under date of November 1, 1834, the report of the superintendent was communicated, in which were stated the condition of the works; the rapid and deleterious effects of the currents and counter currents; and that double the quantity of stone than estimated the preceding year, would be required to close certain breaches.

Under date of November 15, 1835, the report of the superintendent was again communicated to Congress, giving in full the operations of the year; the progress made in the transition from the temporary to permanent constructions; the complete realization of the objects for which the works were designed; the difficulties attending the operations; the effects produced by the currents through the harbor; the benefits to be derived from converting the breach through the north end of the peninsula into a channel for vessels; the value of the improvement and of the harbor, to the commerce of the lakes, to the interior of Pennsylvania, and the country.

Sums appropriated by Congress, viz: above
stated

	\$35,223 18
in 1829,	7,390 25
in 1831,	1,700 00
in 1832,	4,500 00
in 1833,	6,000 00
in 1834,	23,045 00
in 1835,	5,000 00
	<hr/>
	\$82,858 43

No estimate for the completion of this work has been received at this Department.

Dunkirk Harbor, New York.—The act of 2d March, 1827, appropriated \$3,000 "For erecting a pier by contract at the mouth of Dunkirk harbor, New York;" its execution devolving upon the War Department, was charged upon the Engineer Department. No information was furnished on the subject, nor was any previous survey made. The officer to whom the work was committed was required to comply strictly with the act, and not to exceed the appropriation in any event. See letter to Major Maurice, 21st April, 1827, marked F.

Under date of November 20, 1827, it was reported that a contract had been entered into for the construction of the pier, which had progressed with entire success, and would be completed in the course of the year, which referred to *such a pier* and of *such dimensions as was authorized by the appropriation of \$3,000*. A second appropriation of \$6,000 was granted that session; and under date 19th November, 1828, it was reported that the work was nearly completed; that some injury had been sustained by storms, but it was believed the extent was not great, and would soon be repaired. In answer to a resolution of the House of Representatives, the sum of the appropriations granted, \$9,000, was stated as the cost of construction, nor was it known whether an extension of the work would be authorized, or a further appropriation made. A third appropriation was that year made for extending these works, and under date of November 18, 1829, it was reported that the pier constructed was found to have the desired effect; that a small sum was required to complete the planking, to prevent its sustaining injury from being left in an unfinished state.

Under date of 19th November, 1830, it was reported that, in completing the pier, the cost had exceeded about \$700 the appropriation, and that sum was asked for to pay the arrearages due.

Under date of 4th November, 1831, it was reported that, under the appropriation (of \$6,400) made the preceding year, a new pier had been commenced, and extended 280 yards; and that the estimate submitted was intended to cover the expense of completing all that was then proposed to be done at this harbor.

Under date of the 13th November, 1832, it was reported that no additional funds would be necessary to complete the pier to the distance contemplated, viz: ten feet water. Up to this date \$36,755 50 had been appropriated, \$29,257 expended, and \$23,728 the original estimate.

Under date of 23d November, 1833, the result of the inspection of this harbor by Colonel Totten, was also given; the extent, nature, and condition of the works enumerated; and the addition of the pier, breakwater,

and provision for a beacon-light, recommended; which were estimated to cost \$19,700. It was also stated that there were no appearances indicating the instability of the present work, but that the wood work, above water, was rapidly decaying, and in a few years it would become necessary to build strong stone walls, in lieu of the present timber facings, and pave the tops with large flat stones, all laid in hydraulic mortar, for which there was no data at hand to form an estimate.

Under date of November 22, 1834, the report of the superintendent was communicated to Congress, in which was stated the settlement of the stone filling of the piers, and the advantages of refilling them.

Under date of 15th November, 1835, the report of the local engineer was again communicated: the operations of the preceding year, and additions to the pier were stated; and that the available funds were supposed sufficient for the repairs of the breakwater. An estimate for carrying out the operations the present year, accompanied his report, proposing the erection of a beacon light, and showing its necessity; the extension of the breakwater at each extremity, and the advantages thereof; as also the importance of the harbor as a port of refuge; and that it is the only one between Erie and Buffalo.

Original estimate, Doc. 116, 2d sess. 22d Congress	\$23,728	20
Additional do. for beacon light, breakwater, &c.	19,700	00
	<hr/>	\$43,428 20

Amount of appropriations, viz: in 1827	-	-	3,000	00
Do do in 1828	-	-	6,000	00
Do do in 1829	-	-	9,812	75
Do do in 1830	-	-	1,342	75
Do do in 1831	-	-	6,400	00
Do do in 1832	-	-	10,200	00
Do do in 1834	-	-	4,000	00
Do do in 1835	-	-	10,988	43
			<hr/>	51,743 93
Excess of appropriations over estimates	-	-		<hr/> <hr/> \$8,315 73

Estimate for 1836, \$18,500.

Black Rock, New York.—An appropriation of \$30,000 made in 1829, was the first granted for the improvement of this harbor; and, under date of November 18th of that year, it was reported that the object of the appropriation had been in a great measure accomplished by the erection of suitable works of a substantial character; an additional sum for their completion was submitted, as well as the expediency of constructing a mole on the eastern side of the entrance, with a view to the further security of the harbor, agreeably to the plan originally contemplated.

Under date of November 19, 1830, it was reported, that the pier and mole enclosing the western side of the harbor were completed; that the cost of the construction had exceeded by about \$1,800 the amount of appropriations, and that this expenditure had been considered absolutely necessary in order to avoid jeopardizing the safety of the work by leaving an important part of it in an unfinished state. It is also stated, that the protection of the harbor was not completed by the construction of these works, but as an appropriation for the remainder was contained in a bill

passed at the preceding session of Congress, which did not become a law, no notice was taken of it in the estimate for the succeeding year.

Under date of November 4, 1831, it was reported, that no appropriation having been made for continuing the works at this harbor, nothing had been done; and the protection afforded having been imperfect, as was stated in the report of the preceding year, a part of the mole on Bird island, at the head of the harbor, had been overthrown, and an estimate of its repairs and completion was presented.

Under date of November 13, 1832, it was reported, that the funds appropriated for the improvement of the harbor, had been applied to the construction of an ice breaker, to turn the ice and current from the harbor; that no estimate had been received from the agent, and that having understood the last appropriation was sufficient to complete the works, no further funds would be required. It was at the same time stated, that this harbor, in conjunction with all those on the south shore of Lake Erie, were in a situation to render protection and safety to vessels navigating the lake, and to afford facilities in transferring the produce of the surrounding country to market; that the improvement of these harbors had given to the people a spirit of enterprise and industry perceptible on the whole south shore of the lake; that the plans adopted for deepening the channels at the mouths of the rivers, which were choked up with sand, had afforded in their execution, a result far exceeding the expectation of all who were acquainted with their situation prior to the commencement of their improvement; that these works were in part constructed of perishable materials, and as their completion was near at hand, it was highly important that provision should be made by which the injuries to them, arising from decay or unforeseen accidents, might be repaired, and their usefulness preserved. (See page 91, Doc. No. 2, 2d sess. 22d Congress)

Original estimate, Doc. 116, 2d sess. 22d Congress				-	\$37,367 70
Amount of appropriations, viz: in 1829				-	\$30,000
Do	do	in 1830	-	-	3,198
Do	do	in 1831	-	-	1,800
Do	do	in 1832	-	-	5,100
					<hr/>
					40,098 00
					<hr/>
Excess of appropriations over estimate				-	\$2,730 30
					<hr/>

Under date of November 23, 1833, the result of the inspection of this harbor, by Col. Totten, was also reported to Congress. The whole history of the work is there given; the part constructed by the State of New York, distinguished from that built by the United States, and the harbor described. The advantages of constructing a pier to prevent the washing of the sand, which has a tendency along the whole south shore to move down the lake into the harbor, are also stated, and the expense estimated at \$20,000. It was also estimated, that, to complete the mole and erect a beacon light, would cost \$3,000, making the whole amount \$23,000; \$12,000 were granted on this estimate.

Under date of November 1, 1834, the application of the last appropriation was reported to have conformed to the objects designed; that the operations were necessarily slow from the exposed situation of the beach, but that a sufficient length of pier would be put down to show its effects; and

should the result be favorable, the funds then available would be sufficient to prosecute it during the succeeding season.

Under date of November 15, 1835, the operations of the year are reported at length; the distance which the pier extends into the lake is given, and the object of its construction is stated so far to have succeeded: its further success can only be determined by experience, and to be prepared for what might happen, the remainder of the estimate of Col. Totten, is recommended to be granted.

Original estimate, Doc. 116, 2d sess. 22d Cong.	\$37,367 70	
Additional estimate by Col. Totten	23,000 00	
		\$60,367 70
The appropriations as above stated, are	\$40,098 00	
Do do in 1834, are	12,000 00	
		52,098 00
		<u>\$8,269 70</u>

Genesee river.—The report of the survey of this harbor, under the act of May 23, 1828, was communicated to Congress on the 31st January, 1829, in obedience to a resolution of the House of Representatives, and the cost of constructing two piers for the improvement of the harbor was estimated at \$53,919 16; \$10,000 were appropriated that year to commence operations, and it was reported under date of November 18, following, that the construction of the work had been commenced, and continued as far as the available means would authorize.

Under date of November 19, 1830, it was reported, that 270 yards had been added to the length of the piers; that by the close of the season, they would have progressed as far as the means afforded would allow; and that, though incomplete, the benefits of the work had already been felt.

Under date of November 14, 1831, it was reported, that satisfactory progress had been made the past year in the execution of the plan adopted for improving the entrance of this river. About 150 yards had been added to the piers, making the whole length 403 yards; that measures had been taken to secure them against the effects of storms and ice, which they had hitherto withstood in safety, and that the artificial channel continued to deepen.

Under date of November 13, 1832, it was reported, that such had been the previous preparation of materials, and such the fitness of the weather for work, added to the unusual good health of the workmen, that the piers had been advanced beyond the most reasonable expectations, and that so far, they had bid fair to accomplish the object for which they were intended; that the channel which afforded not less than 10 feet water, formerly furnished only six, and that the action of the river upon the bed seemed to indicate that 200 additional yards of pier-work would complete the improvement of that river, which might be accomplished in the ensuing year. The report of Col. Totten, upon this harbor, was also reported under date of November 23, 1833. (Page 87, Doc. No. 1, 1st sess. 23d Congress.) The object and extent of the improvement is there described, as well as the benefits already attained, and that a straight channel, affording 11 feet water, now exists where there was formerly a crooked one varying from 5 to 6. The aggregate length of both piers is stated to be 4,712 feet, which exceed

that originally estimated for by 842 feet. Moreover, that to obtain a depth of water of 15 or 16 feet, the piers would have to be advanced further into the lake, which, according to the estimate of the agent, would cost \$22,500; and that the construction of a beacon light would take \$2,700. The remarks made on the perishable nature of the materials at other points on the lake apply equally to this; thus far the experiment had been completely successful, and to give permanency to these important improvements, the expense was estimated to be about \$34,000, making the total cost of the future operations at the mouth of the Genesee river \$59,200.

Appropriations up to this time, viz: in 1829	\$10,000 00
in 1830	13,335 00
in 1831	16,670 00
in 1832	16,000 00
in 1833	15,000 00
	<hr/> \$71,005 00
Original estimate, (Doc. 116, 2d sess. 22d Congress)	- 53,919 16
	<hr/>
Excess of appropriations over estimates	- - \$17,085 84

Under date of November 1, 1835, the report of the local agent was laid before Congress. The condition of the works, and the operations of the preceding year, are given in detail, and the appropriations for continuing the construction recommended to be based upon the system for perpetuating the existing work, as suggested by Col. Totten.

Under date of November 15, 1835, the report of the local agent was again communicated, in which a review was taken of the appropriations from 1829, and the effects produced up to the date of the report. The mode of the construction of the piers was adverted to, and it was stated that the timber work above water was beginning to decay, and was in a proper condition to be substituted by stone masonry.

Original estimate as above stated	- -	\$53,919 16
Estimate to extend and render the work permanent	- - - -	59,200 00
		<hr/> \$113,119 16
Appropriations as before stated	- -	71,005 00
Do. in 1834	- -	20,000 00
Do. 1835	- -	2,390 00
		<hr/> 93,395 00
Excess of estimates over appropriations	- -	<hr/> \$19,724 16

Oswego Harbor, New York.—The survey of this harbor was made in 1826, by Sailing-master Ford, employed by D. Hugunin, Jr. under authority from the Department, and under an appropriation of \$200, made by Congress for that purpose. In December of that year, his report and estimate of \$33,348 64 for building two piers, was communicated to Congress. (From Index to vol. 1, State Papers, 2d session, 19th Congress, were not printed.) Under the act of March, 1827, Congress appropriated the whole amount estimated for, and directed that no part should be expended, until a contract should be made for completing them, agreeably to the plan proposed

In April of that year, Captain Smith, of the engineers, was ordered to Oswego, to make arrangements to carry into effect the object of the appropriations, and in May, contracted with Moses P. Hatch for the work, to be done under the directions of three commissioners, and the superintendence of D. Hugunin, Jr.

Under date of 20th November, 1827, the fact was reported to Congress, and it was stated that one of the piers had been commenced, and that both would probably be completed the next year.

Under date of 19th November, 1828, it was reported that the prevalence of high winds on the lake, and general sickness in the vicinity, had prevented the completion of this work, as had been anticipated, and that the injuries sustained by the unfinished piers, during a violent storm in October, had rendered it necessary to estimate for an additional sum, to enable the superintendent to meet his engagement with the contractor. The amount of this estimate was \$9,583 39, and was for additional labor and materials, required in rebuilding and repairing damages from storms, as then explained to the Committee of Ways and Means, (H. R. 146) which was granted.

Under date of 18th November, 1829, it was reported that the calm season on the lakes had been too short to enable the contractor to complete the piers, and that the work had sustained some damages by storms, which it was necessary to repair; that the harbor had been inspected by an officer of engineers, who recommended the construction of a pier head for their security; that the estimate embraced three items: 1st, for indemnifying the contractor for damages sustained by storms; 2d, for completing the piers; and 3d, for a pier head; amounting to \$20,411 54. An appropriation of \$7,472 was granted.

Under date of 19th November, 1830, it was reported that the available means had been applied to the construction of 164 yards of the eastern pier, which required 60 yards to complete it. To finish this pier, and to pay a balance due the contractors, according to agreement, an estimate submitted the preceeding year, but on which no funds were appropriated, was again included in the general estimate; \$3,416 84 were appropriated for repairs, and \$18,600 for pier head.

Under date of 4th November, 1831, it was reported that the piers had been built by contract, and were completed, as well as the pier head for their security, and that it was thought that the safety of the navigation required that the piers should be raised higher. It seems that up to this date \$72,420 had been appropriated for this harbor, of which \$36,764 64 were for the construction and repairs of the piers first contracted for, \$17,055 39 for indemnifying the contractors for their losses during storms, and \$18,600 for a pier head or mole. The operations that year had been conducted under the superintendence of Lieut. Tompkins, of the army, and upon his estimate for raising the piers, building counterforts, and completing stone mole, \$19,000 were appropriated for the next year.

Under date of 13th November, 1832, the operations of the year were reported, as well as the benefits attained, in the perfect protection afforded against the encroachments of the heavy sea.

Under date of 23d November, 1833, the result of the inspection of this harbor by Colonel Totten, of the engineers, was reported to Congress, for the purpose, as there stated, of bringing the subject fully to their consideration. (See page 54, Doc. No. 1, 1st session 23d Congress.) The exposed

situation of the harbor is there described; the object of the improvement, mode of construction, and advantages gained, are all stated. It is also mentioned that all the sustaining parts of these structures are of wood, and that all the wooden parts above water were of course rapidly decaying, and that the contemplated operations had reference to a future substitution, which was unavoidable, of an imperishable material for the decaying portions. To attain this end, and to erect a permanent light-house to lighten the entrance, would cost \$105,522 45. Since that time the appropriations by Congress have been made, it is presumed, in accordance with said report, and their application in 1834 and '35, have been reported under dates of 1st and 15th November, respectively. The work since March, 1833, has been conducted by Lieut. Smead of the army.

The amount of the appropriations, viz: in 1827		\$33,348 64
Do.	do	1828 9,583 39
Do.	do	1829 7,472 00
Do.	do	1831 22,016 84
Do.	do	1832 19,000 00
Do.	do	1833 8,400 00
Do.	do	1834 30,000 00
		<hr/> \$149,820 87
Original estimate, including first estimated cost of piers, amounts applied to indemnify contractors, and building pier head, (Doc. No. 116, 2d session 22d Congress.)		\$72,435 87
Additional estimate in 1831, for raising piers, building counterforts, &c.		19,000 00
Estimate in 1833, to render works permanent		105,522 45
		<hr/> 196,958 32
Excess of estimates over appropriations		<hr/> \$47,137 45

Kennebunk river, Maine.—On the 2d March, 1829, Congress made an appropriation of \$5,000, for repairing the pier on the east side of the entrance of the river, no previous examination or estimate having been made. The details of construction were committed to this Department, and arrangements immediately made to carry into effect the wishes of Congress. The work was commenced by an extension of what is called the Hardin, White and Perch rock piers, forming a substitute for that portion of the old pier which had been destroyed by worms and storms.

Under date of November 18, 1829, the progress of the work was reported to Congress, and on the 19th November, 1830, the new pier was stated to be completed.

A further appropriation of \$1,175 was asked for 1831, to secure the connection of the new with the old work, and to make further repairs on the Perch rock and Hardin piers, for their more effectual security.

Estimate for repairs. (Doc. No. 30, 2d session 21st Congress.)	\$6,175 00
Amount of appropriations	6,175 00

Under date of November 4, 1831, the Department reported that the new piers had had the desired effect of protecting the channel of entrance into the

river; but that some additional work was required for the greater security and permanency of the improvement, by repairing a pier built by the United States many years ago. An estimate was accordingly submitted for \$1,700, which sum was appropriated on the 3d July, 1832, a period so late that nothing was done, except the collection of materials, as was reported by the Department, under date of November 13, 1832. It was also stated, at the same time, that it was deemed necessary to complete the improvement on the east side of the channel, to construct a pier of considerable length, extending from the outer (called monument) pier to the bar. The piers before constructed being of wood were, in the course of 8 or 10 years, liable to be destroyed by worms; it was therefore proposed to build the new pier of stone, and accordingly, in the absence of a minute survey, a conjectural estimate of \$9,700, was submitted to Congress, which sum, with \$600 to repair the damages sustained by a pier on the *western* side of the channel, making \$10,300, was appropriated.

Under date of November 1, 1834, the Department reported that the damages to the pier on the western side, and the Perch rock pier (on the eastern side,) had been repaired. This terminated the repairs to old piers, and nothing remained but the construction of the new stone pier, for which it was reported that preparations had been made to commence early the next season.

After a minute survey, it was found that the appropriation of \$9,700 would be insufficient for building the new pier. The Department, therefore, reported, under date of November 15, 1835, that nothing had been done during the season, except to procure materials, deeming it inexpedient to commence, until a sufficient sum was appropriated to complete the work, there being much to apprehend from leaving it in an unfinished state to the action of the storms. A further sum of \$7,500 had therefore been asked to be applied to the new work, to secure the whole with proper fastenings, enlarge the pier head, and raising it sufficiently for a secure base to a monument or light-house, necessary as a guide to the entrance of the harbor.

Whole estimate for repairs of old piers on the eastern and western side of the channel				\$8,475	
Estimate for new stone pier				17,200	
					\$25,675 00
Appropriated in 1829	-	-	\$5,000		
1831	-	-	1,175		
1832	-	-	1,700		
1834	-	-	10,300		
					18,175 00
Asked for in 1836	-	-	-	-	7,500 00

Hudson river.—The whole history of the contemplated improvement of this river, is reported under dates of the 1st November, 1834, and November 15, 1835.

Estimated cost according to 1st plan	-	-	\$819,634 10
2d "	-	-	671,134 11
3d "	-	-	522,634 11
Amount appropriated in 1834	-	-	\$70,000
Asked for in 1836	-	-	200,000

Ocracoke inlet.—In May, 1826, an appropriation of \$1,000 was made by Congress for the survey of Pamlico sound; and in January, 1828, the report of the survey by Captain Bache, of the topographical engineers, was submitted to Congress. (See Doc. 69, 3d vol. 1st sess. 20th Cong.) An appropriation of \$20,000 was made in the following May; and under date of November 18, 1829, it was reported that the operations up to that date, had been confined to the construction and preparation of the necessary machinery.

Under date of November 19, 1830, it was reported that the dredging machine to be used for deepening this inlet, had been completed and put in operation; that in consequence of tempestuous weather, little progress had been made in opening the channel.

Under date of 4th November, 1831, it was reported, that operations had been continued on the part of the channel called the Flounderslue, during all the favorable weather, and about 10,600 yards had been excavated; that experience shows that not more than 150 working days in a year could be counted on, and at the present rate, ten years would be required to complete the proposed excavation; that in order to make as fair an experiment as practicable, it was intended to apply another dredging machine of greater power, in aid of the one then employed, and that its construction was then in a state of forwardness.

Under date of 13th November, 1832, it was reported that operations commenced late in July, when the appropriation became available; that 8,000 yards of sand had been removed from Wallace's channel, and that the depth had been increased from $7\frac{1}{2}$ to 9 feet; that a gratifying circumstance attending the operations was the apparent permanency of the work already accomplished, such as to induce a strong belief in the ultimate success of the experiment; that a new boat of greater power was by that time in operation in conjunction with the old one, and that an additional appropriation being necessary for the ensuing year, an estimate of the amount had been submitted.

Under date of 23d November, 1833, it was reported that operations had been retarded by tempestuous weather, and the breaking of machinery; that from Wallace's channel, about 34,000 yards of earth had been removed within the year, and that a navigation of 8 feet had been obtained through it.

Under date of November 1st, 1834, the whole report of the officer charged with the improvement, was submitted to Congress. It is there stated that operations had been continued with perseverance; that 35,300 yards of earth had been excavated; that though the operations had been but partially successful, they had nevertheless been productive of a decided and useful improvement in the navigation; "that there were circumstances, however, arising out of the peculiar nature of the locality, which, according to the experience of the last season, are such as to create strong doubts of the practicability of improving this navigation to the extent desired by those interested in its improvement, the principal object having been to obtain a draught of ten feet water at high tide. The causes here alluded to, are the uncertain and shifting character of the shoals lying near the inlet." The effect produced at some of the channels; the disappearance of much of the work; and the reappearance of some of the bars are described, and the inference drawn that the permanent improvement by dredging for a greater depth of water than that then existing in Wallace's channel, was uncertain, if not impracticable.

Under date of 15th November, 1835, the whole report of the officer in charge is again submitted to Congress; the obstruction that had appeared at the mouth of Wallace's channel, is there alluded to, but it is stated that little change had taken place since the date of that report. The removal of this obstruction is proposed to be effected by turning the course of the ebb tide into said channel by means of a jettee.

Amount appropriated up to this time, viz: in 1828,	\$20,000	
1829,	21,000	
1831,	17,000	
1832,	22,000	
1833,	16,700	
1834,	15,000	
		\$111,700 00
Original estimate of the cost of work, (Doc. No. 30, 2d session, 22d Congress)		58,000 00
Excess of appropriations over estimate		\$53,700 00

The excess of the actual cost of these operations over the original estimate, is explained by the fact that the number of working days never exceeded 105, including fractions, instead of 200 days of 10 hours each, as anticipated in the estimate; the daily expense of the operations being necessarily the same throughout the season; moreover, the great exposure to which the locality was subject, rendered necessary the construction of a larger vessel, and more powerful engine than originally contemplated, with a greater extent of ground tackle. It was also found, by experiment, that the earth elevated occupied more space by about 30 per cent. than when it formed a part of the shoal, increasing the quantity to be removed in the same ratio; neither of these facts or results being foreseen in the original estimate.

Cape Fear river, North Carolina.—The report of the survey of this river, by Major Bache, of the topographical engineers, made under the act of 20th May, 1826, was submitted to Congress in 1828, (see Doc. No. 127, 3d vol. 1st session, 20th Congress,) and the first appropriation for the improvement of this river was made in 1829.

Under date of November 18, 1829, it was reported that, to avoid, if possible, imposing new duties on the engineer officer at Oak island, it was proposed to place the operations for improving the navigation of this river, under the directions of the State authorities of North Carolina, but the board of internal improvement of that State having requested differently, they were afterwards given in charge to the above mentioned officer; that the lateness of the season at which he was put in charge, and the unhealthiness of the river shores, had prevented the accomplishment of much work previous to the 30th of September.

Under date of November 19, 1830, it was reported that considerable progress had been made in the construction of jetties designed to improve the navigation of this river below the town of Wilmington, when the occurrence of a gale in August, of unusual violence, caused the destruction of a greater part of the works; that the materials had however again been collected without much loss, and that the injury would be repaired as soon as practicable.

Under date of November 4, 1831, it was reported that the operations had been confined, during the last year, to the repairs of the injuries sustained by the jetties from the effects of the gale of August, and to the working of the dredging machine.

Under date of 13th November, 1832, it was reported that the lower western jettee on the river had been completed, as also that near Barnhard creek, with the exception of about two hundred feet; that to prevent the effect of the strong current on the jetties, wings had been constructed, and in some cases had been extended 1,000 feet, yet doubts were entertained as to their stability. That the operations of dredging had been greatly retarded, in consequence of the failure of many parts of the machinery, and the impossibility of repairing it nearer than Baltimore; and that it was believed that a survey of the river, then making, would show an increased depth of about one foot of water in the channel.

Under date of 23d November, 1833, it was reported that the jettee near Barnhard's creek, on the east side of the river, and that near Old Town, on the west side, were completed; that nearly the whole of the labor applied that year had been for the purpose of keeping these two jetties in repair. The local agent reported in addition, that "upon reviewing our operations, we find that we have constructed upwards of 9,000 feet of jettee, and 1,013 feet of wings, for the purpose of throwing off the current which sets parallel with the jettee. In addition to which we have made repairs on the several jetties, by rebuilding those parts which have been entirely destroyed by the gales of wind, and washed up, and otherwise injured by the currents, equal in extent to building all the jetties which are contemplated to be erected in Major Bache's plan for the improvement of the river; we have also gained at least two feet of water in the channel on which we have worked."

Under date of 1st November, 1834, it was reported that the appropriation having exceeded the original estimate, without being attended with any permanent benefit, and the local engineer having suggested a system of improvement, requiring further appropriations, his report was appended. This report speaks of the operations at length—of the difficulties that had been encountered in the construction of the jetties—the want of stone, or other proper materials, to secure them—and the advantages that had been gained to commerce by the operations. It is also stated, that owing to the total destruction of some of the jetties by the August storm, in 1830, and continual repairs to others, large expenditures had been made which would otherwise have gone to other parts of the improvement. That it was in "consequence of those casualties that greater success had not resulted from our labors; they could neither be foreseen nor guarded against; were not under human control; and human wisdom, however profound, could not have exercised its power to arrest them."

Under date of 15th November, 1835, it was reported, that some interruption to the operations had occurred from the death of the officer charged with the improvement; that an inspection of the work had been made by order of the Department, and that the report showed the condition of the present works, and the erection of those recommended.

Up to this date the whole sum appropriated for these works, viz:

In 1829	-	-	-	-	-	\$20,000
1830	-	-	-	-	-	25,688

1831	-	-	-	-	-	\$25,705
1832	-	-	-	-	-	28,000
1833	-	-	-	-	-	28,000
1834	-	-	-	-	-	5,234
1835	-	-	-	-	-	20,000

	Amounting to	\$152,627 00
By Doc. 116, 3d vol. 2d ses. 22d Cong.	the original estimate was	88,412 00

So that the expenditures so far have exceeded the original estimate by	\$64,215 00
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This excess is explained in part by the under estimate of the cost of the work, one item of which was the cost of a running foot of jettee at \$1 60, whereas the actual cost was \$2 25. By the greater quantity of work executed than estimated for, as we see in 1833 the quantity was then about *double*, and by the heavy contingent expenses, not included in the estimate, occasioned by storms, and the loss of time by breakages of machinery, which, as before stated, could not be repaired nearer than Baltimore, and transported via New York. The boat, principal hands, &c. lying idle, or nearly so, during that time.

Red River, La.—An appropriation of \$25,000 was made in 1828, for improving the navigation of this river; Capt. Chase, of the engineers, was directed to examine and report a plan for the purpose of carrying into effect the wishes of Congress, and he accordingly submitted one for improving the navigation around the raft, adapted to the amount appropriated, by opening the communication through Bayou Pierre, and rendering it navigable for keel-boats.

Under date of November 19, 1829, the facts were reported to Congress, and also that an officer of infantry had been detailed to take charge of the operations.

Under date of November 19, 1830, it was reported that the operation for opening a channel round the great raft had been commenced between the outlet of Red bayou and Clear lake, a distance of about 19 miles, 12 of which had been rendered navigable for boats.

Under date of November 4, 1831, it was reported, that the works in progress had been suspended in consequence of the balance of appropriation having passed to the surplus fund; that about 50 miles in extent had been previously effected, and it was believed that great benefit would result from a continuance of the work for which an estimate had been made.

Under date of November 13, 1832, it was reported, that the appropriation became available too late for continuing the works that season, that consequently nothing had been done, which was the less to be regretted, as the Department had reason to believe that the plan of operations heretofore pursued was not such as to afford, even in its accomplishment, any lasting benefit to the navigation of the river; that, instead of deepening the bayous, and connecting them by short canals, and thus opening a communication around the raft, it was the opinion of persons who had opportunities of judging, that the raft itself might be removed through the agency of one or two of the steam-boats then employed on the Mississippi and Ohio rivers, at an expense not exceeding that which would attend the execution of the plan already adopted. By reference to Doc. 98, 3d vol. 1st ses. 23d Con-

gress, it will be seen that the whole subject relating to the change is reported to Congress; the first step taken by the Department; its reference to Captain Shreve; his opinion in relation thereto; his assignment to the superintendence; the measures adopted by him; the difficulties encountered; the advantages gained, not only to the navigation of the river, but to the United States, by bringing into market the land of that country; are all enumerated in papers numbered from 1 to 16, to which is subjoined a sketch of the river.

Under date of November 23, 1833, it was reported, that the work had progressed successfully, and the entire report of the superintendent was submitted.

Under date of 1st November, 1834, it was reported, that the operations had been suspended for want of funds; that the appropriation had been made at so late a period as to render it impracticable to do any thing the preceding summer, but that arrangements had been made by the agent to prosecute the work to the extent of the available means.

Under date of 15th November, 1835, all the information received by the Department, from the agent and inspecting officer, was laid before Congress. The great labor performed is there stated, and the operations in detail enumerated; the distance that remained to be removed (23 miles) is given, as well as the difficulties which must be overcome; that the cost of completing the improvement depended upon so many contingencies, not to be foreseen, upon the stage of the water, and upon the difficulty of obtaining labor, that an estimate was very difficult, if not impracticable; that had the last season been favorable there was no doubt but that the whole work would have been completed, and for the same expenditure that had been made; and that it was equally certain that the work can be completed the following winter and spring, provided the necessary funds are furnished in time to allow a continuance, if necessary, through the whole season, as it may take 3 or 6 months, such is the nature of the improvement.

A subsequent report from the agent has been submitted to Congress, under date of February 20, 1836, giving in detail an account of his operations up to the 18th January, 1836. The difficulties to be overcome seem not to diminish as the work progresses, for it is stated that fifteen miles just completed have cost as much as sixty lower down; that he still expected to complete the work this season; but that a boat would have to be kept in operation for some years in removing the floating timber, &c. that might otherwise lodge; that the price of the land immediately on the banks of the river, in the vicinity, is worth at least five times the amount of the whole expenditure, over and above the value they otherwise would have had, and without taking into consideration the immense tract extending on either side of the river for six hundred miles above the raft.

No estimate for performing this work has ever been made, except that of \$100,000 made in 1833, "as the probable amount for removing the remaining balance of the raft." That originally made by Captain Chase contemplated a partial improvement of the bayou navigation for keel-boats, and made to cover the appropriation of \$25,000 already appropriated.

Up to this date there have been appropriated	-	-	-	\$145,000
in 1828	-	-	-	\$25,000
1832	-	-	-	20,000
1834	-	-	-	50,000
1835	-	-	-	50,000
				<hr/> \$145,000

Cumberland river.—In July, 1832, an appropriation of \$30,000 was made for the improvement of this river, and referred to the Engineer Department for application, no previous survey or estimate having been made.

Under date of 13th November, 1832, it was reported that Captain Delafield, of the engineer corps, had made an examination of this river; and, in conjunction with Captain Shreve, had devised a plan of improvement; and that an agent had been appointed and charged with its execution, under the general direction of Captains Delafield and Shreve.

Under date of 23d November, 1833, it was reported that operations had been commenced; that, owing to the unusual high state of the water, little had been done between October and December, other than the cutting away of the timber overhanging the banks in certain parts, and making preparations for prosecuting the work as soon as the water and season would permit. That the work had been resumed in January, and conducted with much success to the improvement.

Under date of 1st November, 1834, it was reported that the operations had consisted in strengthening the wing dams at Flax Patch bar, the head and foot of Harpeth island, and removing the rock from the channel at Harpeth shoal; that a number of the most dangerous snags had been removed from the bed of the stream, between the shoals and Line island; and that a ledge in the channel of the Devil's chute had been, in part, taken out; and that the whole would be, most likely, removed that fall.

Under date of 15th November, 1835, it was reported that the obstructions at the point called Devil's chute, had been removed, with the exception of about forty yards of rock, which a rise in the river arrested; that, by the construction of wing dams between the islands named, the water was confined to the left shore along the whole extent of the islands; that the steam-boat President, sunk in the island chute, had been raised, together with a number of snags, logs, roots, &c.; that the wing dam at the head of Harpeth shoals had been completed; that the repair of that at Davis's ripple was necessarily suspended from sickness and death among the laborers; that all the snags, logs, &c. from Nashville to Line island, had been removed, and that the estimate presented was to complete the contemplated improvement.

The report of the officer of engineers, who inspected these works, was appended; from which will be seen what has been done, and what remained to be done. It is there stated that the funds now available are inadequate for the construction of what was deemed necessary; that the data for estimating minutely the probable cost of the contemplated work was not at hand, but that the whole of the estimate by the agent, \$30,000, it was believed could be advantageously applied.

By reference to document 116, 3d volume, 2d session 23d Congress, it appears that no estimate was made for this improvement.

Up to this date \$60,000 dollars have been appropriated for the work, and \$30,000 is estimated by the agent to complete, making an aggregate of \$90,000 for the cost of said work.

Escambia river.—An appropriation of \$5,000 was made by Congress under the act of 2d March, 1833. In July following a survey was made by Lieutenant Bowman, under the directions of Captain Chase, to ascertain the nature of the improvement required to fulfil the wishes of Congress. In August a contract was entered into for the execution of the work, to be completed in November following; and under date of the 23d November, 1833, all that had been done in the case was reported to Congress.

Under date of November 1, 1834, it was reported that soon after the appropriation, under the act of 1833, was made, the work had been put under contract, subject to the general supervision of an officer already charged with several works of equal if not of greater importance. That the Department had been then informed that the contractors had failed to fulfil their engagements; that they had partially cleared the river of a small portion of its obstructions, when their operations were arrested by high water; that, in consequence of their dilatory proceedings, it had been determined to take the work out of their hands, and to prosecute it with hired labor; that the exorbitant price of labor had been a further cause of delay; that all this difficulty, which could not but be attended with a sacrifice of much money, would have been avoided could an officer have been spared to take charge of the improvement in the first instance; and that the further prosecution of the work had been, of necessity, transferred to the quartermaster's department.

Up to this time, \$523 33 had been expended out of the \$5,000 appropriated, leaving a balance of \$4,476 67.

Huron river.—Under the act of May 20, 1826, \$5,000 were appropriated "to remove obstructions in the Huron river." The execution of this act was charged upon the War Department, and the details thereof assigned to the Engineer Department. On the 29th of June following, (see directions to Maj. Maurice of that date, marked G,) Maj. Maurice was instructed to proceed to Huron as soon as his other duties would allow, and make suitable arrangement for carrying into effect the wishes of Congress, and to confine his *plan of operations within the appropriation granted by Congress*. The plan and estimate were made accordingly, and a contract entered into for its construction, so far as the available funds would allow. It was therefore reported, under date of November 18, 1826, that a contract had been made for the supply of materials and construction of the work, and that it would be completed in the course of the following year: but the work here alluded to refers only to that contracted for, and authorized by the appropriation, and not to such a plan as the wants of commerce or the navigation of Huron might require.

Under date of November 20, 1827, it was reported that the effect of the work already executed had been to preserve the channel open during the whole summer, which was formerly entirely closed, and it was then sufficiently deep to admit vessels drawing six feet water.

In answer to a call from Congress, an estimate, previously presented by the agent, to extend the pier commenced, and amounting to \$4,413 35, was added to the original appropriation; and \$9,413 35 was reported on the 28th of April, 1828, as the estimated cost of execution of the work, which would be completed (see Doc. 261, 1st session, 22d Congress,) that year.

Under date of November 19, 1828, it was reported that the channel leading into Huron river continued to improve; that vessels had found no difficulty in entering it; and that the completion of the projected works would constitute a safe harbor: that the greater part of the sum last appropriated had been expended in raising to their intended height the portions of piers already constructed, the deepening of the channel having occasioned a settling of from six to nine and twelve feet in the work.

Under date of the 18th November, 1829, it was reported that one of the piers intended to form the channel had been completed, and the other re-

quired an addition of one hundred and fifty yards of pier work. A small additional sum was required for planking and raising these piers in some parts, where the action of the current had caused them to settle.

Under date of November 19, 1830, it was reported that the western pier had been completed, and that there remained sixty yards of the eastern pier to construct, to extend it across the outer bar, and that the depth of water had increased to nine feet at the shallowest part.

Under date of November 4, 1831, it was reported that the extension of the eastern pier had been effected, and a sufficient depth of water thereby insured; that the estimate (of \$1,500) for the next year was to repair a part of this pier, which was built (by a company of Ohio) before the work was taken in charge by the United States. The two piers first contemplated by Major Maurice, as being the least necessary for the improvement of this harbor, and which were constructed from year to year as Congress granted means, were completed, and the experiment of improving said harbor had so far succeeded. In Doc. 116, 3d volume, 2d session, 22d Congress, the original estimate for this work is stated to be \$20,706 84, and the appropriation up to this time amounted to \$20,708 71.

Under date of November 29, 1832, it was reported that the harbor was in good condition; that no new work had been constructed during the past season; that the funds had been applied to secure those already constructed; that additional works were necessary to complete this harbor, though no further appropriation would be required for that object. It was at the same time stated, that all the harbors on the south shore of Lake Erie were in a condition to offer protection and safety to the commerce of the lake; that the application of the appropriations by Congress had given to the people a spirit of enterprise and industry, which was perceptible on the whole south shore of the lake; that the plans adopted had afforded a result far exceeding the expectation of all acquainted with the subject; but that the works were in part constructed of perishable materials; and that it was highly important that provision should be made to repair unforeseen accidents and preserve their usefulness.

Under date of November 23, 1833, it was reported for the reason given, and which has been referred to while speaking of other points on the lake, in order that the subject should be brought fully to the consideration of Congress, that a thorough inspection, by a skilful and experienced engineer, had been made of all other works, and that his report, as well as that of the local agent, was submitted. By these it will be seen, the quantity and description of work that has been executed, the advantages gained, the successful accomplishment of the experiment, and in fact if the result of experience could have been foreseen, that the "same plan would have been pursued, and of course, no money had been lost in experiments." It is also stated, that a pier head for each pier was deemed advisable, for the safety of vessels entering the harbor; that a beacon light on one of them was indispensable, and that the upper timber work ought to be replaced by strong walls, the cost of which could not be estimated. A further appropriation was that year made for the first of these objects, and its application reported under date of November 22, 1834, when the entire report of the superintendent was given. It is there stated, that the appropriation was made so late in the season, and the cholera appearing immediately after, that the prosecution of the work was greatly retarded, and the attainment of materials and labor rendered very difficult. That, therefore, little had

been done, except to procure materials; that the appropriation was considered sufficient, except for the mason work, and keeping the piers in repair, and that the works were in good condition.

Under date of November 15, 1835, the report of the superintendent was again submitted to Congress. It is stated that the work would require the attention of Government, as early in the spring as possible; that much of the wood work first sunk (which is presumed to be that built before the work was taken in charge by the United States) was quite defective; that the sand driven along the shore, passed through the piers, and was filling up the harbor. That he proposed to sink brush in bundles along the outside, and to cover them with stone, which it was thought would remedy the evil, but should it not, short planks might be spiked on the outside of the piers, and inside the brush and stone. That it would also be necessary to repair some portion of the old work, and to remove the sand already deposited.

Since 1831, when, as was stated, the works originally projected were completed, \$8,200 have been appropriated to carry out the recommendations of Colonel Totten, making the total amount appropriated for this work \$28,908 71.

Harbors of New Castle, Marcus Hook, Chester, and Port Penn.—On the 20th of May, 1826, \$22,000 were appropriated for constructing "new piers at New Castle," and \$3,000 for repairing "old ones."

Under date of November 18, 1826, it was reported that the engineer at Fort Delaware had, in pursuance of instructions, furnished a plan for the piers at New Castle; that the sum estimated to be necessary for its fulfilment, was greater than the sum appropriated for the purpose. That it was designed to afford shelter to vessels from floating ice and storms, as well as to produce a greater depth around the old piers. That its entire completion was supposed necessary to the fulfilment of both objects. But that it was possible both might be accomplished, by a partial completion of the plan to the extent the appropriation would authorize, and that the mode of construction had been adopted to this possible event.

The amount of the above named estimate was \$30,125 20. But in answer to a call made by Congress, during the session of 1826, '7, the amount already appropriated, viz: \$25,000 was stated as the cost of construction, instead of said estimate, as it was not known whether Congress would appropriate further. (See Document 261, volume 6, 1st session, 20th Congress.)

Under date of November 20, 1827, it was reported that the plan adopted for this improvement had been entrusted to an officer of engineers, but as the necessary arrangements could not be made until late, it was not expected that much progress would be made until the ensuing spring.

Under date of November 19, 1828, it was reported that the services of the officer of engineers who directed the construction of these works, having been required elsewhere, the superintendence of them had been committed to a civil agent, who had continued their construction satisfactorily. That the appropriation of \$4,413, made by act of 23d of May last, for the repairs of public piers at Port Penn, Marcus Hook, and Fort Mifflin, was entrusted to the same agent, and arrangements made for effecting them at an early period. By reference to Document 261, volume 6, 1st session, 20th Congress, it will be seen that \$4,412 43 is stated to be the estimate of the repairs of these harbors, and \$91,689 33 as the cost of

their *improvements*. The *first* of these estimates was granted, and it is the application of this sum, to the repairs of said harbors, that is referred to in the report, under date of November 18, 1829, where it is stated that the annual report of the superintendent had not been received, but from his monthly report it was concluded that the piers in the Delaware at the several points, "*are very nearly, if not quite finished.*"

Under dates of November 19, 1830, November 4, 1831, and November 13, 1832, it was reported that under appropriations granted by Congress, a dredging machine had been constructed and applied to deepening these harbors, and nearly a similar report was made under date of November 23, 1833; it was also added, that some progress had been made in repairing one of the piers at Marcus Hook, using stone for all that part above low water mark, and that to persevere upon the plan heretofore pursued was not deemed advantageous, as it was believed that results accomplished by it, would not be attended by permanent good. The plan here alluded to was that of *dredging out the enclosed basins*, pursued under the partial appropriation of Congress, merely for temporary benefit.

Under date of November 1, 1834, it was stated that no report in reference to these improvements, had at that time reached the Department, for the reasons conjectured, and under date of November 15, 1835, a succinct history of the whole improvement, from the date it was transferred to the United States, by the States of Pennsylvania and Delaware, up to that time, was given, which is again annexed, as it gives in few words the views taken by the Department, as well as the measures pursued and recommended on this subject.

Memoir on the improvements and repairs of the harbors of Chester, Marcus Hook, New Castle, and Port Penn, on the Delaware river.—These harbors were constructed by the States of Pennsylvania and Delaware, previous to the year 1789, for the purpose of rendering the navigation of the Delaware "easy and safe," and as a protection to vessels against floating ice in the winter season. They were ceded to the United States in 1789 and 1827. The preservation and repairs of these harbors are required by the tenor of the acts of Pennsylvania and Delaware, ceding them to the United States, and the necessity for places of security for vessels navigating the river and bay in the winter season.

An appropriation was made by Congress in 1829, for the repairs of these harbors, about which time it was thought advisable to connect the detached piers, then forming the several harbors, by wharf-work, connecting the outer piers with the main land, and thus forming a basin enclosed on three sides, two of which are perpendicular to the thread of the current, intending to remove the accumulation of mud from within these basins by a steam dredging machine.

In 1830, an appropriation was made for the purchase of, and putting in operation, this dredging apparatus. In 1831, an additional appropriation was made for continuing this operation, as also in 1832 and 1833.

In the spring of 1833, the superintendence of these harbors was confided to the undersigned, at which period the steam dredging machine was in operation at Marcus Hook, excavating the earth from within the enclosed harbor, formed at that place. On the 30th of September of that year, I showed in my annual report, that 47,686 cubic yards of earth had been

removed up to that date, and 15,369 yards during the year ending that day, affording a "safe and secure" anchorage for about twenty vessels at Marcus Hook; and that some progress had been made in repairing one of the piers of this harbor, using stone for all that part above low water.

It was stated in the report for that year, that to persevere upon the plan heretofore pursued, of enclosing basins, and removing the deposite annually with dredging apparatus, is not deemed either advantageous towards effecting the desired object, or, when accomplished, answering a permanent good.

The estimates for the ensuing year were based upon a new system of operations, and the only one calculated, in my opinion, to attain the object in view; as also upon the plan, then in operation, of continuing the dredging apparatus within the enclosed harbors.

In January, 1834, a memoir was prepared and forwarded to the Engineer Department, assigning the reasons for recommending an abandonment of the dredging system, and the construction of new piers, in advance of the old ones, at each of the harbors, (except Chester) as the only means of making a place of safety on the Delaware for vessels in the winter season, and stating that no harbor then existed to protect vessels against the ice, (except at Chester,) and could not, until new piers were constructed.

The appropriation for the year 1834, was not made until July, and was the minimum sum stated in the estimates. The engineer department, being satisfied that the plan of dredging was useless, authorized its abandonment, and that the funds available should be applied towards the construction of such work as formed part of the system recommended by me. In furtherance of this plan, the work of the season was confined to opening the sluice-ways at Marcus Hook, between the piers, to prevent an eddy and further deposite within the harbor, and to the repairs of the southeastern pier, the lower side of which had given way below the water level. To effect this, a new pier was sunk immediately below, and alongside of the defective one, the intermediate space filled with large masses of stone, and from the low water mark, building up the whole pier with blocks of stone, bolted together with copper.

In the annual estimate for the succeeding year (1835) dated 30th September, 1834, it is stated this estimate is for the construction of a new pier at Marcus Hook; any attempt to clear out the old harbors by dredging machines, being worse than useless, as from the formation of this (Marcus Hook), and the other harbors, the deposite from the river waters must very soon fill them again; and that my views in relation to these harbors were expressed fully in the memoir for the previous year, and had undergone no change, but were rather strengthened by the observations of the year; and further, that no harbor can exist (except at Chester) to guard the commerce of the Delaware against ice, until new piers are constructed, and that I had caused the dredging machine that I had found in operation on being assigned to this duty, to be laid up, and its use abandoned; and further, that the limited means appropriated for the year, had been applied to repairing the outer piers at Marcus Hook with stone masonry, from low water mark up, as a part of the system necessary in the formation of a harbor, by the construction of new piers; and that two of these piers were necessary at Marcus Hook and New Castle. Whether Port Penn was susceptible of a like construction, remained to be ascertained

after seeing the surveys ordered for that purpose. The estimates for the year, as before observed, are based upon the construction of new piers, and gave, as the maximum, the sum necessary for perfecting the harbor of Marcus Hook on this system. The minimum being to construct one pier only, leaving the second for a succeeding year.

In August, 1834, a report was made to the Engineer Department, called for by an order of the 21st of that month, which stated, "that unless the appropriations are made with a view of reconstructing these harbors by building new piers, I cannot recommend the partial and limited appropriations, with which I can accomplish very little to the advantage of the public interest."

The appropriation for the year 1835, was made available in April, and proved to be less than half of the sum necessary to construct *one pier*.

Since the last annual statement, the plan has been persevered in of applying these limited means to repairing the outer piers of these harbors with stone from the low water mark up, cutting away the impediments to a free passage for the tides through the harbors.

At Marcus Hook, the southeastern pier has been repaired on this plan, and the two sluice-ways between the outer piers have been removed; the effect of which has been not only to prevent any further deposit, but has caused, by the action of the tides, the removal of much of the mud from within this harbor lying above the level of the bottom of the openings made between the piers, serving as a preservation of the harbor more against future injury than any good that the commerce of the Delaware can derive from it in its present state.

The limited appropriation for the year could not be applied at Marcus Hook in effecting any useful object whatever. The only manner in which it could be applied was at New Castle, in carrying into effect so much of the plan recommended as it would accomplish in the removal of the obstructions to the free passage of the current through this harbor and between the piers, and repairing the northeastern pier with large stone from low water up.

In furtherance of this application of the available means, a sluice-way has been partially opened, the northeastern pier cut down to low water mark, a foundation prepared thereon for laying the masses of stone for its reconstruction, and stone purchased for raising the work four feet high; after accomplishing which, the funds will be so nearly absorbed as to render any further progress impracticable.

In submitting estimates for continuing the improvements of these harbors, I have based them upon the plan recommended from the first moment of addressing you in relation to them, the propriety of pursuing which is strengthened and confirmed in my estimation by every year's observation, as the only means of gaining and securing a "safe and easy" navigation of the Delaware, as required by the acts of Delaware and Pennsylvania, ceding these harbors. I have accompanied the annual estimates with a general plan of the harbor of New Castle, exhibiting its condition, the works proposed for its improvement, with a detailed plan for the projected works, and another of the works now under construction.

In conclusion, I must again recall to your recollection that there is no harbor for the protection of vessels navigating the Delaware in the winter, except at Chester, and that I cannot make any of the harbors safe at such seasons, with the small sums heretofore appropriated; and again observe,

that it is better not to appropriate these small sums at all, as with them the object in view cannot be attained.

All of which is respectfully submitted.

RICHARD DELAFIELD,
Capt. of Engineers.

To Brig. Gen. CHARLES GRATIOT,
Chief Engineer.

Philadelphia, October, 1835.

By reference to the statement furnished the Committee of Ways and Means, at their request, and subjoined to their report, under date of February 13, 1836, it will be seen that all the estimates made for these various works, for the different purposes there stated, and under the different dates given, amount to \$207,053 18, and that the whole amount appropriated by Congress up to that time, is \$74,546, and that therefore these appropriations are by \$132,507 18, under the estimates.

STATEMENT showing the yearly expenditures that have been made upon the public works at New Castle, Marcus Hook, Chester, and Port Penn, corresponding with the amounts drawn from the Treasury under the respective heads of appropriations, and accounted for by the agents superintending the works.

Heads of appropriation.	Expenditures in									
	1827	1828	1829	1830	1831	1832	1833	1834	1835	Total.
Building piers at proper sites in the river Delaware, at New Castle -	\$2,104 01	\$2,000 00	\$17,895 99	-	-	-	-	-	-	\$22,000 00
Repairing the old piers at New Castle, and deepening the water around them -	-	-	3,000 00	-	-	-	-	-	-	3,000 00
Repairing public piers at Port Penn, Marcus Hook, and Fort Mifflin -	-	4,413 00	-	-	-	-	-	-	-	4,413 00
Repairing piers at Marcus Hook, for filling up the sluice between the said piers, and improving the harbor of Marcus Hook by the removal of obstructions -	-	-	5,000 00	-	-	-	-	-	-	5,000 00
Improving the harbors of New Castle, Marcus Hook, Chester, and Port Penn, in the Delaware river -	-	-	-	\$6,600 00	\$7,400 00	\$5,550 00	\$7,500 00	\$2,050 00	\$11,033 00	40,133 00
	\$2,104 01	\$6,413 00	\$25,895 99	\$6,600 00	\$7,400 00	\$5,550 00	\$7,500 00	\$2,050 00	\$11,033 00	\$74,546 00

2.

STATEMENT of the several estimates which have been made of the cost of necessary improvements at certain harbors in the Delaware river.

Estimates, when made.	New Castle.			Marcus Hook.			Chester.			Port Penn.			Port Mifflin.		
	Repairs and ex- cavations.	New works.	Total estimate.	Repairs and ex- cavation.	New works.	Total estimate.	Repairs and ex- cavation.	New works.	Total estimate.	Repairs and ex- cavation.	New works.	Total estimate.	Repairs and ex- cavation.	New works.	Total estimate.
1826	-	\$30,125 20	\$30,125 20	-	-	-	\$5,383 40	-	\$5,383 40	\$325 10	\$51,535 65	\$51,860 75	\$2,271 04	\$9,528 67	\$11,799 71
1827	-	-	-	\$1,815 12	\$38,136 10	\$39,951 22	-	-	-	-	-	-	-	-	-
1834	-	-	-	-	24,726 00	24,726 00	-	-	-	-	-	-	-	-	-
1835	-	43,206 90	43,206 90	-	-	-	-	-	-	-	-	-	-	-	-

B.

CHICAGO, ILLINOIS,

September 30, 1834.

SIR: In conformity with paragraph of General Army Regulations, I have the honor to submit the following observations on the operations of the Engineer Department, for "improving the harbor of Chicago, Illinois," now under my direction.

The work was commenced in the summer of 1833, under the direction of Major Fowle, first, and afterwards Major Bender; but such was the difficulty in a new and remote country, as this then was, in procuring the necessary implements, materials, and workmen for the construction, that notwithstanding every exertion, consistent with prudence and duty, on the part of these gentlemen, the progress of the work was limited, during the season; to the laying of a crib-work dam or pier, to the surface of the water, nearly across the river on the line of the south pier, and, after an interval of about 70 feet extending a detached pier, 230 feet long, across the bar separating the river from the lake. This last construction rested on the sand on a level with the surface of the lake and river: was six feet high, and floored on the second tier of logs, and filled with stone. The pier across the river was intended to direct the water into the channel around and under the portion of the pier so detached, to enable it to sink as the action of the water might remove the sand from under it. This experiment, however, was not very successful in its object. The crib work across the river was not so tight as to hinder the ordinary water of the river from passing through it, and discharging at the usual mouth; and it was not till spring, when an unusual rise of water, produced by the overflowing of an extraordinary flood of the Des Plaines river in the Chicago, that the water made its way into the new channel cut out for it, and occupied by the detached pier. A deep but narrow channel was then formed on the north side of this pier, which has continued ever since to discharge most of the water of the river. But the pier has sunk in a position so much deranged, (and heretofore described to the Department in my letter of February 26 and May 16,) that, as a part of the work, it must be considered, at most, useless; for the expense of adjusting a superstructure to its present derangement will, at least, equal any advantage that may be derived from it in its place.

The works came into my charge on the first of February last, from which time until the official announcement of the appropriation by Congress for the present year, contained in your letter of July 3d, received July 23d, I had employed a few hands, in addition to the master workmen retained from last year, in making preparations for prosecuting the work on the next appropriation. These consisted in completing the piledriver which had been begun, and the scow framed last season—building an additional crane scow—making barrows and other implements, and erecting shops and other buildings for the accommodation and facilities of workmen. I had also procured, on contract, a quantity of timber for the piers, and had contracted for a small quantity of stone, to be delivered as soon as the construction would be commenced.

The present plan of construction, changing materially the original plan, was also, in the mean time, matured and submitted, and sanctioned by the Department.

The amount of money left available to me, from the appropriation of last year, was not enough, after the expenses incurred as above, to commence the work, and accordingly no more was done until the present appropriation, than to thus make all necessary arrangements for prosecuting operations on a scale adapted to the amount in prospect for the season.

The construction was accordingly commenced on the north pier, and the first crib laid in the lake, on the first day of August, seven days after the receipt of your letter of July 3d, advising that the appropriation was available. Every favorable day since, the work has advanced on this pier, and of which there is now laid, in the lake, one foot above the surface of the water, and secured with its complement of piles, and partly filled with stone, six hundred and thirty-two feet, extending beyond the crest of the outer bar to within two or three inches of nine feet water; one crib (30 feet) more on this line, and which will be laid the first calm day, will complete the *length* of this pier, *in the lake*, for the present season.

It is expected that the remaining operations of the season will carry up and complete, to its proposed, height of seven feet above water, all of the north pier now laid, and carry out, of the south pier, a line of 200 feet, to a height of two feet above water. Any other work which the season may permit, will be applied to the wheeling of sand from the bar between the piers, and to the extension of the north pier, back, across the bar, towards the river.

Owing to the lateness of the appropriation, much difficulty has obstructed the supply of an adequate quantity of stone. The contractor for one thousand cords, Mr. Hugunin, has experienced a much greater expense and embarrassment in the quarrying, and in building and procuring the scows necessary to float it, than could have been anticipated, in consequence of the high price of labor and the scarcity of workmen.

He is, however, a highly respectable and responsible man, and is intent, although he may experience loss by it, on complying fully with the conditions of his contract.

No delay has occurred to the work for want of stone; as I had, previous to the time of Mr. Hugunin's contract, purchased and contracted with another person for three hundred and fifty cords, which was all previously required.

The part of the north pier now laid promises entire permanency. The plan of construction, viz: the squaring of the piles and driving them on the interior of the crib, with the ties framed to embrace and shoulder on them, has succeeded beyond expectation in giving strength to the work and facility to its construction; of which some idea may be formed from the fact that more than one hundred feet of pier, in from five to seven feet water, with the piles driven, stood through the hardest northeast gale of the present season, without a particle of stone in it, and not a log or pile, or bolt, pin, tenon, or joint, was, in any degree, moved, injured, or deranged from its position.

The strength thus given to the work is so much the more gratifying, as perhaps no pier has been any where built on the lake, in a more bleak, exposed, or difficult situation, than this one.

At the commencement of the building of the piers of this harbor, there existed, and there still exists, many difficulties which do not seem to have been known in the first estimate for this work, and which cannot be realized by the Department without a knowledge of this section of country.

From this point, south and southeast, there is no timber suitable for the piers within thirty or forty miles. From this, west, it is from twelve to twenty miles to the timber upon the Des Plaines river; and to the north and northwest, excepting a small quantity of oak, from eight to fifteen miles; and adjacent to the north branch of Chigago river there is no timber available for the works.

The Pinery on the Calamick river, from which the works have been supplied last season and this, and with a very indifferent material, is now nearly or quite exhausted of good timber by the drain upon it from this place for building purposes, and whatever of pine timber that may be hereafter used on the public works, will probably be shipped from the east side of Lake Michigan.

The public land adjacent to Chicago, which is at all grown over with timber, is low, wet, and marshy, from which it is impossible to wheel large timber excepting in the winter season, when the ground is frozen; and wherever good soil and timber occurs, near the river, the land is claimed and owned by squatters and settlers, who have recently acquired their rights under the pre-emption act of the last session of Congress.

The remainder of the oak timber required for the work must be obtained from one of the three following places: from the swamps to the northwest and near this place, from which it may be wheeled, only in winter, either here, or to some point on the river, from which it may be rafted here in the spring; from the shores of the north branch of the Chicago river, ten miles above Chicago, whence to raft it will require considerable expense to remove logs, &c. from the channel of the river; or from the St. Josephs or Calamazoo rivers, on the east side of Lake Michigan, whence it must be shipped in lake vessels. From whichever of these places it may be obtained, it must be expensive, and hence the high price, 14 cents per foot, assigned to this material in my estimate for 1835.

The supply of stone another year may also be expected to be attended with increased difficulty. The quarry laying, as it does, almost on a level with the surface of the river, as they descend into it, the expense of keeping it dry, by pumping, will greatly increase the expense of raising the stone.

The contractor for one thousand cords this year will probably lose money on his contract, (at \$5 46,) and the Department may not expect it again so cheap; moreover, the quarry now used is on the canal land of the State of Illinois, which will, probably, pass into private hands soon after the next sitting of the State Legislature, and there is no other place from which the stone can be obtained with the same facility and cheapness.

The articles of subsistence and forage may require some special notice. In the summer and fall of 1833, and the spring and summer of 1834, the emigration to this place exceeded all calculation so far, that the resources of the country within fifty miles of Chicago has not supplied one-fifth part of most of the articles of subsistence and forage required; and such has been, and is now, the demand for these articles, that it is a source of profit to wheel grain and provisions from the Wabash, a distance of from sixty to one hundred miles, or to ship the same from the lower lakes.

In justification, however, of great expenditures for this work may be offset the importance of this harbor to the commercial interests of the nation, when it is recollected that this place, at no distant day, is destined, from its position and the projected canal that is to connect its trade with the Mississippi, by the Illinois river, to form an important link in the great

chain of trade from the Atlantic and lakes to the "great west," and Mississippi valley. Although this point has now no internal ways for extending its commercial intercourse, other than bad roads, yet one hundred and eighty vessels of from thirty to one hundred and forty tons burden have already arrived and departed during the present season of navigation. From these facts it is supposed that this work will be considered as entitled to as great an expenditure of public money as any other of the kind on the lakes.

The estimate for the whole work made and submitted agreeable to your instructions is the result of careful and diligent calculation and research, and is believed to be not far from correctness. The estimate for dredging, appended, is made without any practical knowledge of operations, and may require some correction as to cost, though, from inquiry, it is not believed to be too great.

The whole amount estimated for expenses of next year, may be advantageously applied during the next season.

The amount that may be left from the present appropriation, after the operations of the last quarter, may, perhaps, be well applied to the getting of timber during the coming winter, and on this subject the Department will hereafter receive a special communication.

I am, sir, with great respect,
Your obedient servant,

J. ALLEN,
Lt. U. S. A. on engineer duty.

To Brig. Gen. C. GRATIOT,
Chief Engineer, Washington, D. C.

ESTIMATE of funds requisite for the operations for "improving the harbor of Chicago, Illinois," during the year 1835, exhibiting, in detail, the nature, extent, cost, and probable application, within the time specified, of the several objects embraced in the contemplated expenditure.

Nature of workmanship, materials, and contingencies.	Aggregate.			
	Maximum.		Minimum.	
	Extent.	Cost.	Extent.	Cost.
<i>Workmanship.</i>				
Carpentry - - - -	2,925 days		2,925 days	
Smithry - - - -	394 days	\$3,285 00	394 days	\$3,285 00
Labor of men - - -	9,930 days	591 00	9,930 days	591 00
		6,904 00		6,904 00
<i>Materials.</i>				
Pine timber, squared, 12 by 12 inches	26,670 feet		26,670 feet	
Do. round logs, 24 feet long	1,334 logs	2,266 95	1,334 logs	2,266 95
Oak timber, squared, 12 by 12	25,270 feet	1,667 50	25,270 feet	1,667 50
Do. do. 14 by 14	3,450 feet	3,537 80	3,450 feet	3,537 80
Do. 10 by 10 & 8 by 10	8,800 feet	552 00	8,800 feet	552 00
Round oak logs, 24 ft long, 11 in. dia.	865 logs	968 00	865 logs	968 00
Plank, 3 inch oak (plank measure)	30,000 feet	1,297 50	30,000 feet	1,297 50
Iron, 1 inch square bars	8,000 lbs.	1,620 00	8,000 lbs.	1,620 00
Spikes, 9 inch	41,914 lbs.	560 00	41,914 lbs.	560 00
Stone	3,515 cords	4,191 40	3,515 cords	4,191 40
		24,605 00		24,605 00
<i>Contingencies.</i>				
Subsistence - - - -	15,464 rations		15,464 rations	
Purchase of two horses	2 horses	3,963 50	1 horse	3,963 50
Purchase one yoke oxen	2 oxen	180 00		90 00
Tools, implements, cordage, and pulleys	-	60 00		
Oakum, pitch, tar, paints, &c.	-	1,000 00		900 00
Pine plank, 2 inch	-	200 00		200 00
Pine boards	7,000 feet	238 00	7,000 feet	238 00
Stationery and printing	10,000 feet	170 00	10,000 feet	170 00
Iron, assorted	-	200 00	-	200 00
Nails, screws, locks, &c.	2,240 lbs.	156 80	2,240 lbs.	156 80
Forage	-	50 00	-	50 00
Compensation for disbursing	-	620 00	-	620 00
Do. for assistant and clerk	-	581 66	-	581 66
Stone	-	1,390 00	-	1,390 00
	1,000 cords	7,000 00	1,000 lbs.	7,000 00
		\$67,856 11		\$67,606 11

J. ALLEN, Lt. U. S. A. on engineer duty.

OFFICE OF PUBLIC WORKS, Chicago, Illinois, September 30, 1834.

C.

CHICAGO, ILLINOIS,
September 30, 1835.

SIR: The operations for "improving the harbor of Chicago," have been prosecuted on a plan commensurate with the amount of funds available for the work, during the present season, and have been successful to the full extent contemplated at the beginning of the season.

The north or weather pier has been continued in crib work, 480 feet beyond the construction of last season; and 80 feet more, terminating in a crib 40 feet broad, will be added in a few days, extending this pier to a length, in the lake, of 1,260 feet, and to a depth of 12 feet water.

The new portion is now nearly filled with stone, and is one foot above water. The old work, or that of last season, and which was left 5 feet above water, has been partly completed to its full height of 7 feet. And it is expected that the whole length of 1,260 feet will be built up to its intended height and finished this fall.

This will complete the north pier according to the original plan, excepting the pier head, which it has not been deemed prudent to construct this fall, as circumstances, which I will explain, may render a further extension of the pier necessary, during another season. The pier of last year extended 700 feet from the lake shore, past the crest of the outer bar, and to a depth of full 9 feet water. It was observed this spring that a *new bar* had formed, commencing at a point on the lake shore, about half a mile from the pier, on its weather side, and running oblique to the line of the pier, till it passed it about 140 feet from the end of the work. This bar left but 8 feet water, out in the line of the work, where last year there was 10 and 12 feet. And should a similar formation be again caused by the work, as at present terminated, it can only be overcome by again extending the pier across it. Soundings will be made and pains taken to ascertain whatever conformation the bars may assume, during the next winter, and the Department will be duly informed of the result. I may remark that immediately at the end of the pier of last year, and for 60 feet beyond, the sand had entirely gone, leaving where the first two cribs were sunk, this season, a clean clay bottom, at a depth of 18 feet from the surface, and which was, last season, covered with 9 feet of sand.

The north pier has fully answered expectation in strength and permanency, and it has already been useful to many vessels; lately, as many as 5 schooners, at the same time, have sheltered behind it while discharging their cargoes.

The south pier has also been advanced 500 feet, making it now 700 feet long, in the lake, besides the portion of it constructed across the river and bar during the first season of operations. This pier now extends to 7 feet water; its crib work is laid one foot above the surface; the piles are all driven, and it is nearly filled with stone.

Whatever further work the season may permit me to do on this pier, will be directed to levelling it up, and building on it above water.

The 2 piers thus enclose a channel of 200 feet in breadth, of from 3 to 7 feet water; now ready for the operation of a dredging machine, which must be employed to deepen the channel, and which it is hoped will be in full operation by the middle of next season.

The current of the river has made no impression on the sand in the channel, the same depth of water between the piers having been remarked all summer.

Six thousand dollars of the appropriation of this year, has been reserved for the purchase of an engine and dredge, for the dredging machine; it being necessary to secure the construction and use of the machine next season, that the machinery of it, which must be procured at some place remote from this, should be contracted for and made during the coming winter; and probably before another appropriation will be made available.

Of the further means which I shall think it necessary to take to procure this machine, you will be timely advised.

The difficulties mentioned in my last report, as attending the conduct and administration of the operations on the public works, at this place, have rather increased than diminished during the present season. The great and continued emigration to the town and country, has kept all kinds of grain and provisions scarce and dear, and often difficult to procure at any price; and the very great demand for laborers and mechanics on the buildings and improvements of the town, has maintained a very high rate of wages for the workmen.

The influx of this class of emigrants has been great too, but the apparent facilities offered them for securing valuable portions of public land by settlement on it, and which were confirmed to such settlers and claimants by their success at the recent land sales here, have encouraged mechanics and laborers on arriving, or soon after, to abandon their appropriate trades and occupations for a bright hope of soon making their fortunes under the pre-emption laws.

Some of my best workmen, and who had been on the works since their commencement, have, since the sales at this place, refused to continue at a rate of wages from \$1 50 to \$2 00 per day, and have gone to Milwaukee and elsewhere, to "make locations" on public land, in the confident expectation of securing a portion of it at the minimum price when it shall be brought into market. The constant changes of workmen thus made, has been embarrassing and expensive to the work.

The season has not, thus far, been very favorable. During the whole of the present month the lake has been so much agitated by winds that no new work could be laid, and but little stone could be delivered. The remainder of the fall, however, is expected to be favorable, as it usually is, and, as I have before remarked, there remains but three cribs or eighty feet more to be laid, to complete the length of the north pier to the extent intended this fall; it is confidently expected that the weather will be favorable enough for the operations in reserve for the fall.

The stone contractor has experienced the same difficulty as myself in procuring labor, and from the same causes; yet the exertions he is now making will certainly enable him to complete his contract, and to exceed it as much as I may require of stone in addition to the quantity contracted for.

The price of materials, particularly timber and sawed lumber, has greatly increased since last year. The land in the neighborhood of Chicago, from which alone timber can be conveniently procured for the works in summer, has been purchased at the late sales by individuals who value the timber at a high rate; nor is it practicable to bring timber from the east side of the lake, except at exorbitant prices for its transportation in vessels.

The best method, therefore, of securing timber for another season, will be, as was done last winter, to send a party of men to the woods of the public lands, twelve miles north of Chicago, and near the north branch of the river, where they may get out the requisite supply, and draw it to a point on the river, whence it may be rafted and floated to the works in the spring. In favor of this method I will remark, that the quantity of timber which I caused to be procured in this way last winter, could not have been purchased at this place, at any time during the summer, for twice the amount it did actually cost.

Sufficient funds will be reserved from the present appropriation, to cover the expenses during the first quarter of 1836, of a party of about thirty workmen to be employed in the manner proposed.

It will be seen from the "statement of balances," accompanying, that \$6,985 will remain from the appropriation of this year, applicable to the service of the next. This will be expended in the first quarter of 1836 for the objects before mentioned, viz: purchase of machinery for a dredging machine and getting out timber in the woods.

This sum deducted from the aggregate estimate for the next year will leave a balance of \$61,365 maximum, or \$59,365 minimum, required to be appropriated for the service of 1836.

With this amount it will be practicable to complete both the piers from the lake shore to their full contemplated length in the lake, including the pier heads; to construct the dredging machine with the necessary lighters, and to keep it in operation for the remainder of the season after it may be completed; and, by means of it, to open a channel practicable for vessels to enter the river before the close of the season.

It is important to the interest of this place and the surrounding country, that the full amount of the estimate should be appropriated, in order that the improvement may be speedily effected, and the magnitude of these interests, and their dependent connection with the trade and commerce of the lakes, may be, in a manner, estimated from the fact that, since the opening of navigation in the spring up to this date, two hundred and twelve vessels have arrived and discharged their cargoes. By far the greater number being laden with merchandise, shipped at Buffalo and Detroit, and destined for this market, and the country north, west, and south.

Very respectfully, sir,

I have the honor to be,

Your obedient servant.

J. ALLEN.

Lt. U. S. A. on engineer duty.

Brig. Gen. C. GRATIOT,

Chief Engineer.

CHICAGO, ILLINOIS, September 25, 1834.

Aggregate estimate of funds necessary to complete the public works for improving the harbor of Chicago, Illinois, after the operations of the year 1834.

Materials	-	-	-	-	-	\$89,294 60
Workmanship	-	-	-	-	-	30,974 00
Contingencies	-	-	-	-	-	10,028 60

Aggregate amount required to complete the two piers	130,297 20
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Additional expenses of removing, by dredging, 64,444 cubic yards of sand and gravel, from the channel between the piers, at 50 cents per cubic yard	-	-	-	\$32,222 00
Aggregate expense of the whole work	-	-	-	<u>\$162,519 20</u>

The time contemplated by the foregoing estimate, in which the piers may be completed, is *two years*, or two seasons of seven and a half months each.

The operations for clearing the channel, by dredging or other means, will require one season more: as, in consequence of the liability of the sand so removed to be replaced by the action of the lake, these operations ought not to be begun until the piers are extended in the lake beyond the region of deposite.

Respectfully submitted :

J. ALLEN, *Lt. U. S. A.*
On engineer duty.

To Brig. Gen. C. GRATIOT,
Chief Engineer, Washington, D. C.

ESTIMATE of funds requisite for the operations for "improving the harbor of Chicago," during the year 1836, exhibiting, in detail, the nature, extent, cost, and probable application within the time specified, of the several objects embraced in the contemplated expenditure.

Nature of workmanship, materials, and contingencies.	Aggregate.			
	Maximum.		Minimum.	
	Extent.	Cost.	Extent.	Cost.
<i>Workmanship.</i>				
Carpentry - - - -	3,848 days -	\$5,772 00	3,848 days -	\$5,772 00
Carpentry, ship - - -	1,014 " -	2,028 00	1,014 " -	2,028 00
Labor of men - - - -	8,892 " -	6,840 00	8,892 " -	6,840 00
Smithry - - - -	420 " -	630 00	420 " -	630 00
Subsistence of workmen - -	16,756 rations	4,189 00	16,756 rations	4,189 00
<i>Materials.</i>				
Softwood timber sq'd 12 by 12 inch.	29,000 feet -	2,900 00	29,000 feet -	2,900 00
Soft round logs, 24 feet long -	1,450 logs -	1,450 00	1,450 logs -	1,450 00
Oak timber, squared, 12 by 12 inch.	10,000 feet -	1,400 00		
Do do 14 by 14 inch.	2,000 " -	360 00		
Do do 10 by 10 and 8 by 10 inch.				
Oak logs, round, 24 feet long -	1,500 logs -	1,500 00	1,500 logs -	1,500 00
Plank, 3-inch, oak - - -	54 M feet -	3,240 00	54 M feet -	3,240 00
Iron, 1 in. square bars - - -	3½ tons -	525 00	3½ tons -	525 00
Iron, flat - - - -	1,500 lbs. -	120 00	1,500 lbs. -	120 00
Spikes, 9 inch - - - -	31,150 " -	3,115 00	31,150 lbs. -	3,115 00
Stone - - - -	3,225 cords	19,350 00	3,225 cords -	19,350 00
<i>Contingencies.</i>				
Purchase of horses - - - -	1 horse -	90 00	1 horse -	90 00
oxen - - - -	2 yoke -	150 00	2 yoke -	150 00
Tools, implements, cordage, and pulleys - - - -	-	1,550 00	-	1,550 00
Oakum, pitch, tar, paints, &c. -	-	700 00	-	700 00
Pine plank, 2 inch - - -	13 M ft. plank	780 00	13 M ft. plank	780 00
Pine lumber, assorted - - -	11 M ft. board	330 00	11 M ft. board	330 00
Iron, assorted - - - -	3½ tons -	500 00	3½ tons -	500 00
Nails, screws, locks, &c. - -	-	75 00	-	75 00
Forage - - - -	-	1,550 00	-	1,550 00
Compensation for disbursing -	365 days -	730 00	-	730 00
Do in lieu of fuel and quarters - - -	365 " -	292 00	-	292 00
Do for clerk - - - -	12 months -	600 00	-	600 00
Stationery - - - -	-	85 00	-	-
Steam dredging machine, with engine 15-horse power - - -	-	6,000 00	-	6,000 00
Transportation of same: - - -	-	-	-	-
Albany, New York - - - -	-	1,500 00	-	1,500 00
		\$68,350 00		\$66,590 00

J. ALLEN. *Lieut. U. S. A. on engineer duty.*

OFFICE OF PUBLIC WORKS, Chicago, Illinois, September 30, 1835.

D.

ENGINEER DEPARTMENT,

Washington, July 10, 1826.

SIR: An act passed at the last session of Congress, "for improving certain harbors and the navigation of certain rivers and creeks, and for authorizing surveys to be made of certain bays, sounds, and rivers, therein mentioned."

Among the objects for which provision is made in this act, are several in the New England States, which it will be necessary to assign to you for fulfilment.

They are here stated, and the sums appropriated for defraying the expense of their fulfilment are also stated, viz:

Maine.

For building a pier on Steel's ledge, near the harbor of Belfast	- \$1,200
For making a survey to ascertain the practicability and utility of removing obstructions to navigation in Piscataqua river, and the expense of effecting the same	- - - 200

Massachusetts.

For the preservation of the point of land forming Provincetown harbor	- - - 3,500
For making surveys of the following places, viz: The flat on the northwest side of the harbor of Edgartown, to ascertain the practicability of building a light-house thereon, and the utility of the same to navigation, and of preventing the said harbor from being filled up with sand; the bar at the mouth of Merrimack river, and the practicability of deepening the channel over the same; and the harbor of Hyannis, in the Vineyard sound, to ascertain what improvements can be made in the same for the safe anchorage of vessels; and the expense of effecting severally these objects	- - - 500

Connecticut.

For making a survey of Sangatuck river and harbor, and to ascertain the expediency and expense of removing the obstructions to the navigation thereof, and of facilitating the commercial intercourse between the port of Sangatuck and the city of New York	400
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The War Department has recently been charged with the fulfilment of the several objects of the act of which those just mentioned are a part, and has assigned to the Engineer Department the execution of the details thereof.

The naked act having been referred to the Department, without any of the data upon which the several objects were founded, did not afford adequate information to warrant any measures being taken towards the execution of those objects. Recourse was had to the files of the House of Representatives; and, after some delay, memorials and correspondence relating to some of the objects were procured, and contain all the information which

is now in the possession of the Department. Copies will be transmitted herewith, of such as relate to the several objects herein committed to you.

It is not intended that you should bestow more attention upon the fulfilment of these objects than may be requisite for ascertaining what is necessary to be done, selecting suitable persons to superintend the execution, and furnishing the needful instructions for their government therein. The appropriations appear to be small, and would be, very probably, insufficient for the accomplishment of any of the objects to which they refer, unless the inhabitants should be sufficiently interested in the successful prosecution of the objects to volunteer their aid in personal services, as well as in affording facilities of transportation, &c.

The pier for Steel's ledge, and the work to be done for the protection of Provincetown, seem to be entitled to precedence in the order of being attended to.

It will be necessary for you to go to Steel's ledge, in order that, on your way there or returning, you may leave instructions with the commanding officer at Fort Constitution, in Portsmouth harbor, for executing the repairs of that work, for which an appropriation of \$2,500 was made at the last session of Congress.

It may not, however, be absolutely necessary that you should go to Provincetown. It is probable, under your general instructions, Mr. Zabdiel Sampson, who was one of the commissioners upon whose report the application for the appropriation for that place was predicated, would be competent to lay off the work, appoint a superintendent, and furnish detailed instructions for carrying on the work. A great portion of the work appears to be of the nature of that upon which he has been engaged at Plymouth beach. It is, however, left entirely to yourself, whether to go yourself or send Mr. Sampson or some other person.

Colonel Anderson, topographical engineer, will be directed to report to you, and to carry into effect such instructions as you may furnish him with, in relation to the several surveys of Piscataqua river, harbor of Edgartown, mouth of Merrimack river, the harbor of Hyannis, in the Vineyard sound, and the river and harbor of Sangatuck. It might be proper to suggest to Colonel Anderson the necessity of adapting his arrangements to the limited amounts of the several appropriations for defraying the expense of those surveys, which amounts, limited as they are, must not, under any circumstances, be exceeded.

It would be very desirable that these several operations should be commenced at an early day, and that as much progress as possible should be made in them before the 30th of September next. The condition, at that date, of the various operations under the Engineer Department being exhibited in the annual report thereof, it is at least interesting to have the means of presenting them as creditably as possible to those whose exertions have not been spared to make them so.

Colonel Anderson will disburse the moneys to be applied to the several surveys, but the sums to be applied to the pier at Steel's ledge, and to Provincetown harbor, must be disbursed by persons to be selected by you. It would be better if the person employed to superintend could be entrusted with the disbursements. Whoever may be employed, must be governed in keeping and rendering his accounts by the regulations, two copies of which are herewith enclosed to be delivered to them. If they could be returned to the Department when the operations are completed, it would be

desirable. The distribution has been greater than was anticipated, and very few remain of the small number that were printed.

If the projects for the pier at Steel's ledge, and for the preservation of Provincetown harbor, which are suggested in the documents sent herewith, should not be approved of by you, entirely, you are authorized to modify them or substitute others.

It may not be adverted to by those to whom your instructions may be furnished, that they are required, by the regulations, to transmit a copy of them to the Engineer Department, and therefore it would be well, in your instructions, to direct them to do so.

It would be desirable to receive a report of the progress made in each of the several operations up to the 30th of September next, in order that the substance thereof may be introduced in the annual report of the Chief Engineer, as has been already alluded to.

By order of the Secretary of War :

I have, &c.

J. L. SMITH,

Captain corps engineers,

Acting in the absence of the Ch. Eng.

Lieut. Col. J. G. TOTTEN,

Corps of engineers, Newport, R. I.

E.

ENGINEER DEPARTMENT,

Washington, June 28, 1824.

SIR: Congress appropriated, at the last session, twenty thousand dollars to repair Plymouth beach, in the State of Massachusetts, with a view to prevent the harbor at that place from being destroyed.

It is contemplated to have this work executed under the direction of this Department, but at present there is no officer of competent experience who could be regularly assigned to that duty. Under the possibility, however, that it may be in your power to attend to it without interference with your duties at the south, the Department is disposed to confide it to your charge, and will do so, if, on the receipt of your answer, it shall appear that such an interference is not probable. It is not likely that it will require your personal attendance longer than two months, but if it should not be completed within that time, and your services could not be longer continued at it without prejudice to the paramount claims of your regular station, it is very probable it will have been advanced by that time to such a state as to admit of its being carried on under the direction of an officer of less experience than you possess. Should you, therefore, be able to devote two months to that duty, without prejudice to your regular duties, you will, to save time, proceed, on receipt hereof, to the spot, ascertain what is proper to be done, and report the same to this Department, together with your opinion as to the manner in which it should be done, the means requisite to effect it, and the period at which it will probably be finished. You will also make an estimate of the whole expenses, and of the sum necessary to begin with, and accompany the latter with a detailed project of application.

I have the honor to be, &c.

By order:

J. L. SMITH,

Capt. corps of engineers.

Lieut. W. H. CHASE,

Corps of engineers, Boston.

F.

ENGINEER DEPARTMENT,

Washington, April 21, 1827.

SIR: By an act of Congress, approved on the 2d of March last, entitled, "An act to authorize the improving of certain harbors, the building of piers, and for other purposes," appropriations were made for effecting, among others, the following objects, viz:

"For erecting a pier by *contract*, at the mouth of Dunkirk harbor, in the State of New York, three thousand dollars."

"For improving Cleaveland harbor, in the State of Ohio, ten thousand dollars;" and,

"For completing a pier at the entrance of La Plaisance bay, in the Territory of Michigan, *agreeably to the plan and estimate made under the act of the 20th of May last*, three thousand nine hundred and seventy-seven dollars and eighty-one cents."

The execution of such parts of the act of Congress just cited as relates to these and similar objects, has devolved upon the Department of War, and their details have been charged upon this Department; and you have been selected by it to carry into effect the objects of the three appropriations before stated.

You will accordingly proceed to the execution of them as soon as you can do so without inconvenience to the operations in which you are engaged at Presque Isle.

In regard to the two first mentioned works, the Department is not furnished with any documents or papers affording information; and in reference to the last mentioned work, the pier to be constructed at La Plaisance bay, I enclose herewith a copy of a letter from Lieutenant Colonel Kearney, dated January 15th, 1827, transmitting a report of a survey of that bay made under his orders by Lieutenant Campbell Graham, with an estimate of the cost of building a pier at the entrance of the bay, and a chart of part of Lake Erie embracing it. Copies of the report and estimates alluded to are also transmitted. These constitute the "plan and estimate" referred to by the act of Congress, "agreeably" to which it provides for the construction of the pier. The chart was sent to Congress last winter, and cannot now be obtained, otherwise a copy of it would be forwarded to you at this time. Should it be recovered, a copy of it will be furnished to you without delay.

The erection of the pier at the mouth of Dunkirk harbor is, as you will observe from the language of the law, which is precisely quoted on the occasion, to be done by contract; the mode of improving Cleaveland harbor is not pointed out by the law; and the formation of a pier at the entrance of La Plaisance bay is, as before said, to be done according to the plan and estimate of Lieutenant Graham.

The Department, relying upon the zeal and ability with which you have heretofore discharged the duties confided to you, and upon the experience acquired by you in the execution of duties of a similar character to those now committed to your superintendence, will not prescribe any particular course for your government in the prosecution of these operations, except so far as to refer you to the letter of the 29th of June last, communicating to you its instructions with respect to the accomplishment of objects of a

like nature to those herein assigned to you, by the principles of which letter, so far as they may be applicable to those objects, you will be guided.

The intentions of the act of Congress must be strictly complied with, and the appropriations not, in any event, exceeded.

I avail myself of the occasion to send you herewith, two reports of the Board of Internal Improvements, made in February, 1825, and December, 1826, upon the contemplated Chesapeake and Ohio canal.

And, am, &c.

ALEX. MACOMB,

Major General and Chief Engineer.

Capt. T. W. MAURICE,

Corps of eng's, Presque Isle, on Lake Erie.

G.

ENGINEER DEPARTMENT,

Washington, June 29, 1826.

SIR: An act of Congress which passed on the 20th ultimo, authorized a number of appropriations "for improving certain harbors, and the navigation of certain rivers and creeks, &c. &c." and among them were the following, viz:

To remove obstructions at the mouth of Grand river	-	\$5,620 00
For the same purpose at the mouth of Ashtabula creek	-	12,000 00
For the same purpose at the mouth of Cunningham creek	-	2,000 00
For the same purpose in the Huron river	-	5,000 00

Within the last two weeks, the War Department has been charged with the execution of the act above stated, and has assigned the details thereof to the direction of the Engineer Department.

The operations at Presque Isle are, no doubt, so thoroughly organized as to require very little of your personal attention, to ensure the successful progress of the works. That circumstance relieves the Department from any hesitation which might otherwise have been felt about assigning you to the fulfilment of the objects contemplated by the four appropriations just mentioned.

You will, therefore, as soon as practicable after the receipt hereof, proceed to Ashtabula creek, ascertain the nature and extent of the obstructions proposed to be removed, and the plan for effecting their removal, which was in the view of those with whom originated the application for the aid of the National Government. Having possessed yourself of the requisite information, a great part of which may, probably, be procured from or through Mathew Hubbard, Esq. prepare a plan and estimate as rough as may be, (the estimate to be within the appropriation,) and transmit them without loss of time to this Department. As the same materials will, probably, be resorted to and used, whatever plan may be adopted, viz: timber, stone and brush, they being equally adapted to piers formed of piles and of frame work, arrangements may be immediately entered into or set on foot for procuring them, at the times and places at which they may be wanted, at least in such quantities as would be required, at all events, for a com-

mencement, and by this means, the decision upon the project and estimate to be submitted by you, may, on its receipt by you, be carried into effect without loss of time.

The arrangements for the prompt prosecution of the work, above adverted to, may be made pending the preparation of the project and estimate, so that on the completion of the latter, there will be nothing to detain you at Ashtabula creek, and you will be enabled to proceed to Cunningham creek, and make in reference to that place, and adapted to the objects contemplated by the appropriations, to be accomplished there, a project and estimate, together with arrangements of the nature of those required to be made at Ashtabula. A company incorporated by the State of Ohio have already attempted, and, in a measure, succeeded, in effecting the desired improvement of Cunningham creek. It is understood the company has agreed to relinquish the work done by them, upon which was expended four or five thousand dollars. The experience acquired by the managers of the company will, no doubt, be valuable, and entirely at your disposal.

Having transmitted to the Department, your project and estimate respecting Cunningham creek. you will proceed to Grand river, and having made there the preliminary examination, project, estimate and arrangements, as required to be made at the other places mentioned, and having transmitted the results to the Department for decision, you will proceed to Huron river, and effect the same in relation to that place.

The company formed for effecting the improvement of the mouth of Grand river, have released to the Government their right to the work, which has been executed by them for that purpose. Such a release is not necessary at Huron river, where the expense of the work done has been defrayed by voluntary contributions. You have already prepared an estimate for Grand river, upon data furnished you. It is believed you will find the data to have been incorrect, and that the expense will be considerably less than the estimate contemplates.

However necessary the contingent expenses embraced in that estimate might be to ensure the most advantageous prosecution of the work, the amount is altogether disproportionate to the amount of the appropriation, being nearly one-half. It would never answer to build or purchase scows for the small amount of transportation required, nor would it answer to have a separate piling machine for each of the operations. Indeed it would not be necessary: one would answer for two places, and probably for three, and Ashtabula and Cunningham creeks, and Grand river, being, comparatively, near to each other, the same facilities might be transferred from one to the other, and accommodate the whole. If these facilities, scows, pile drivers, &c. or a part of such as would be required, could be dispensed from the works at Presque Isle, and as they are nearly completed it is supposed they might, the contingent expenses of the operations at those places would be materially diminished. Huron river would be beyond the reach of any aid that could be spared from Presque Isle, but the zeal and public spirit which has been shown by its inhabitants, and particularly those who have heretofore conducted the improvements designated, will probably lead to arrangements which may supersede any necessity for relying on distant aid.

The great importance of these improvements will induce every exertion on the part of the inhabitants at the several places at which they are to be

made, to facilitate the operations, and prevent the limited appropriations from being exhausted in contingent expenses. Hence you may, with confidence, rely on the services of respectable and responsible gentlemen, being volunteered free of expense, in superintending the various details of the operations, and the disbursement of the moneys applied to them. And I think it may be confidently expected, also, that boats and vessels suitable for transporting materials, and other facilities, will be loaned or hired at very moderate rates.

A survey was made by Capt. McNeile, of the mouth of Asthabula. If a copy can be procured it will be transmitted to you.

It is of great importance that your projects and estimates should be furnished to the Department at an early date. It is presumed, as the plans are expected to be mere rough sketches, you will not be detained at Ashtabula longer than a week; and that you will get through at the places in a much shorter time, as you may, by correspondence, have all the requisite information matured before you go to them.

I have, &c.

J. L. SMITH,

Capt. eng. acting in the absence of Ch. Eng.

Capt. T. W. MAURICE,

Corps of eng. Presque Isle, Pa.

P. S. To save time you may send the original projects and estimates, and they will be returned to you with the decision upon them; and at leisure, copies may be prepared and transmitted for the files of the Department.

J. L. S.